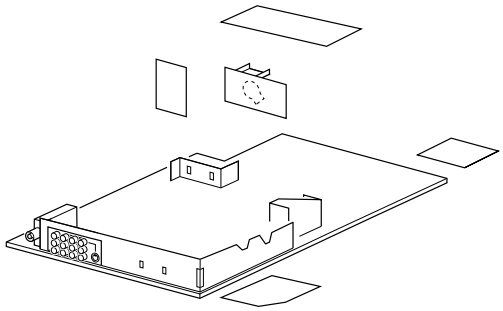
L01.1A
AC

Service
Service
Service



Service Manual

Contents **Page**

1. Technical Specifications, Connections, and Chassis Overview 2
2. Safety and Maintenance Instructions, Warnings, and Notes 4
3. Directions for Use 6
4. Mechanical Instructions 16
5. Service Modes, Error Codes, and Faultfinding 18
6. *Block Diagram, I²C, Supply Voltage, and Testpoint Overviews*
   - Block Diagram 23
   - I²C and Supply Voltage Diagram 24
   - Testpoint Overview Mono Carrier & CRT Panel 25
7. *Electrical Diagrams and PWB's* *Diagram* *PWB*
   - Power Supply (Diagram A1) 26 41-46
   - Line Deflection (Diagram A2) 27 41-46
   - Frame Deflection (Diagram A3) 28 41-46
   - Tuner IF (Diagram A4) 29 41-46
   - Video IF + Sound IF (Diagram A5) 30 41-46
   - Synchronisation (Diagram A6) 31 41-46
   - Control (Diagram A7) 32 41-46
   - Audio Amplifier (Diagram A8) 33 41-46
   - NICAM, 2CS, BTSC Stereo Dec. (Diagram A9) 34 41-46
   - Audio/Video Source Switching (Diagram A10) 35 41-46
   - BTSC-NDBX Stereo Decoder (Diagram A11) 36 41-46
   - Front IO, Front Control and HP (Diagram A12) 37 41-46
   - Rear IO Cinch (Diagram A13) 38 41-46
   - Diversity Tables 39
   - PIP + Tilt Interface (Diagram A16) 40 41-46
   - CRT Panel: ECO Scavem (Diagram B1) 47 49-50
   - CRT Panel: ECO Scavem (Diagram B2) 48 49-50
   - Side AV Panel + Headphone (Diagram C) 51 51
   - Top Control Panel (Diagram E) 52 52
   - Degaussing + DAF Panel (Diagram G) 53 53
   - Front Interface Panel (Diagram Q1) 54 54

Contents **Page**

8. Alignments 55
9. Circuit Description 61
   - Abbreviation List 70
   - IC Data Sheets 71
10. Spare Parts List 72
11. Revision List 76

©Copyright 2003 Philips Consumer Electronics B.V. Eindhoven, The Netherlands.
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of Philips.

Published by RB 0364 Service PaCE Printed in the Netherlands Subject to modification EN 3122 785 13210

PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index:

1. Technical Specification
2. Connections
3. Chassis Overview

Note:

- Described specifications are valid for the whole product range (see Product Survey for specific models).
- Figures can deviate slightly from the actual situation, due to different set executions.

1.1 Technical Specifications

1.1.1 Reception

Tuning system	:	PLL
Colour systems	:	NTSC 3.58, 4.43
	:	PAL B/G, B/H, D/K, I
	:	SECAM B/G, D/K, K1
Sound systems	:	FM-Stereo
	:	2CS (B/G, China, Korea)
	:	2CS B/G, DK
	:	BTSC DBX
	:	NICAM B/G, D, D/K, I
	:	BI-NICAM B/G, D, D/K, I
A/V connections	:	NTSC 3.58, 4.43
Channel selections	:	100 or 125 channels
	:	UVSH or full cable
Aerial input	:	75 Ohm
	:	IEC- or F-type

1.1.2 Miscellaneous

Audio output	:	Stereo: 2 x 1 W or 2 x 3W or 2 x 5W or 2 x 10W
	:	Mono: 1 x 1W or 1 x 3W or 1 x 4W or 2 x 2W
Mains voltage	:	90 - 276 V or 150-276V
Mains frequency	:	50 / 60 Hz
Ambient temperature	:	+ 5 to + 45 deg. C
Maximum humidity	:	90 %
Power consumption	:	52 W (20") to
	:	120 W (36")
Standby Power consumption	:	< 3 W

1.2 Connections

1.2.1 Front/Side Connections and Front/Top Control

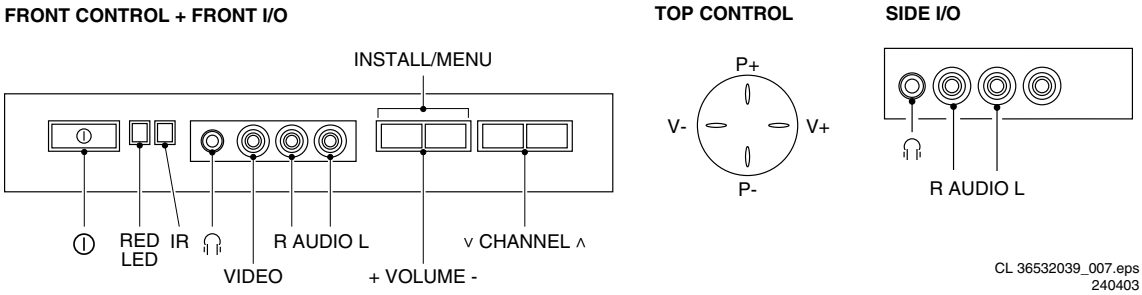


Figure 1-1 Front/Side connections and Front/Top control

Audio / Video In

1	- Video CVBS	1 Vpp/75 Ohm	
2	- Audio L	0.2 Vrms/10 kOhm	
3	- Audio R	0.2 Vrms/10 kOhm	
4	- Headphone	8 - 600 Ohm, 4 mW	

1.2.2 Rear Connections

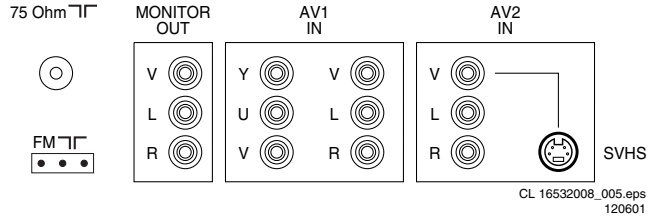


Figure 1-2 Rear connections

Monitor Out

1	- Video CVBS	1 Vpp/75 Ohm	
2	- Audio L	0.5 Vrms/1 kOhm	
3	- Audio R	0.5 Vrms/1 kOhm	

AV1 YUV In(if present)

1	- Y	0.7 Vpp/75 Ohm	
2	- U	0.7 Vpp/75 Ohm	
3	- V	0.7 Vpp/75 Ohm	

AV1 In

1	- Video CVBS	1 Vpp/75 Ohm	
2	- Audio L	0.5 Vrms/10 kOhm	
3	- Audio R	0.5 Vrms/10 kOhm	

AV2 In

1	- Video CVBS	1 Vpp/75 Ohm	
2	- Audio L	0.5 Vrms/10 kOhm	
3	- Audio R	0.5 Vrms/10 kOhm	

AV2 In (SVHS)

1	-	gnd	
2	-	gnd	
3	- Y	1 Vpp/75 Ohm	
4	- C	0.3 Vpp/75 Ohm	

1.3 Chassis Overview

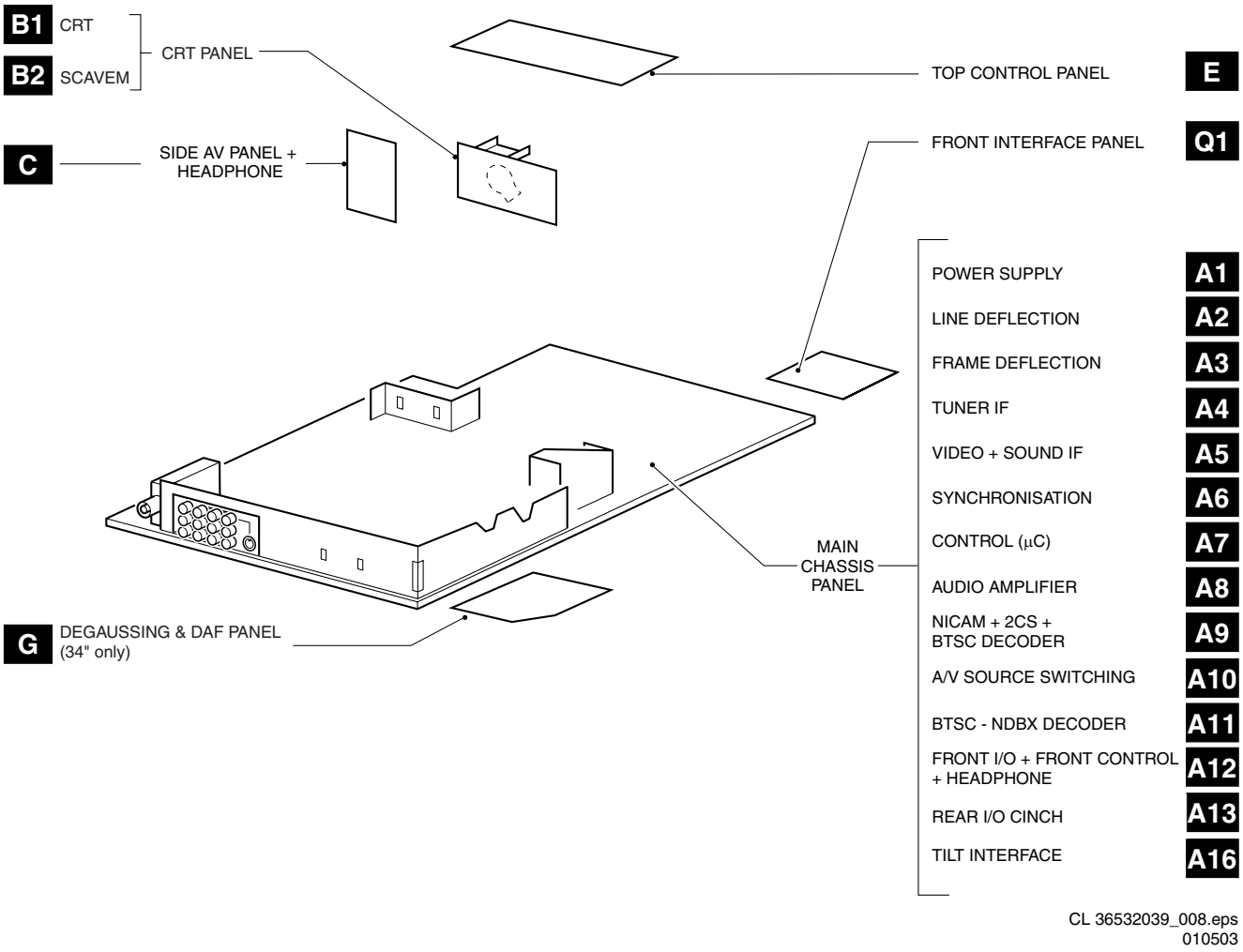


Figure 1-3 PWB Location

2. Safety & Maintenance Instructions, Warnings, and Notes

Index of this chapter:
1. Safety Instructions for Repairs
2. Maintenance Instructions
3. Warnings
4. Notes

2.1 Safety Instructions for Repairs

Safety regulations require that during a repair:
- Due to the 'hot' parts of this chassis, the set must be connected to the AC power via an isolation transformer.
- Safety components, indicated by the symbol ⚠, should be replaced by components identical to the original ones.
- When replacing the CRT, safety goggles must be worn.

Safety regulations require that after a repair, the set must be returned in its original condition. Pay particular attention to the following points:
- General repair instruction: as a strict precaution, we advise you to resolder the solder connections through which the horizontal deflection current is flowing, in particular:
  – all pins of the line output transformer (LOT)
  – fly-back capacitor(s)
  – S-correction capacitor(s)
  – line output transistor
  – pins of the connector with wires to the deflection coil
  – other components through which the deflection current flows.

Note: This resoldering is advised to prevent bad connections due to metal fatigue in solder connections and is therefore only necessary for television sets more than two years old.
- Route the wire trees and EHT cable correctly and secure them with the mounted cable clamps.
- Check the insulation of the AC power cord for external damage.
- Check the strain relief of the AC power cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the AC plug and the secondary side (only for sets that have an isolated power supply). Do this as follows:
  1. Unplug the AC power cord and connect a wire between the two pins of the AC plug.
  2. Turn on the main power switch (keep the AC power cord unplugged!).
  3. Measure the resistance value between the pins of the AC plug and the metal shielding of the tuner or the aerial connection of the set. The reading should be between 4.5 MOhm and 12 MOhm.
  4. Switch the TV 'off' and remove the wire between the two pins of the AC plug.
- Check the cabinet for defects, to prevent the possibility of the customer touching any internal parts.

2.2 Maintenance Instructions

It is recommended to have a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:
- When the set is used under normal circumstances, for example in a living room, the recommended interval is three to five years.
- When the set is used in an environment with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is one year.
- The maintenance inspection includes the following actions:
  1. Perform the 'general repair instruction' noted above.
  2. Clean the power supply and deflection circuitry on the chassis.
  3. Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

- In order to prevent damage to ICs and transistors, avoid all high voltage flashovers. In order to prevent damage to the picture tube, use the method shown in Fig. 2-1, to discharge the picture tube. Use a high voltage probe and a multi-meter (position Vdc). Discharge until the meter reading is 0 V (after approx. 30 s).

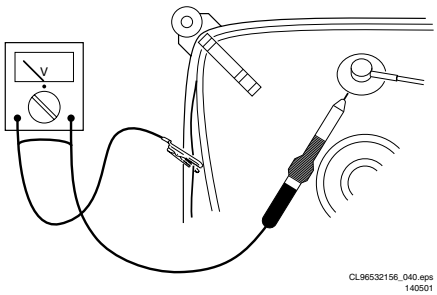


Figure 2-1 Discharge picture tube

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this potential.
- Available ESD protection equipment:
  – Complete kit ESD3 (small tablemat, wristband, connection box, extension cable, and ground cable) 4822 310 10671.
  – Wristband tester 4822 344 13999.
- Together with the deflection unit and any multi-pole unit, flat square picture tubes form an integrated unit. The deflection and the multi-pole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.
- Be careful during measurements in the high voltage section and on the picture tube.
- Never replace modules or other components while the unit is switched 'on'.
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.4 Notes

2.4.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the area of circuitry being tested.
- The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see “Service Modes, Error Codes, and Faultfinding” section) with a color bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 61.25 MHz (NTSC, channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in standby (⏻). These values are indicated by means of the appropriate symbols.

- The picture tube panel has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
- The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

2.4.2 Schematic Notes

- All Resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kOhm).
- Resistor values with no multiplier may be indicated with either an 'E' or an 'R' (e.g. 220E or 220R indicates 220 Ohm).
- All Capacitor values are expressed in Micro-Farads ($\mu = x10^{-6}$), Nano-Farads ($n = x10^{-9}$), or Pico-Farads ($p = x10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An 'asterisk' (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Electrical Replacement Parts List. Therefore, always check this list when there is any doubt.

2.4.3 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions - reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.
- **Before powering up the TV set with the back cover off** (or on a test fixture), attach a clip lead to the CRT DAG ground and to a screwdriver blade that has a well insulated handle. After the TV is powered on and high voltage has developed, probe the anode lead with the blade, starting at the case of the High Voltage Transformer (flyback - IFT). Move the blade to within two inches of the connector of the CRT. **If there is an arc, you found it the easy way, without getting a shock!** If there is an arc to the screwdriver blade, replace the part which is causing the problem; the High Voltage Transformer or the lead (if it is removable).

Safety Information and Useful Tips

Safety Information

- Disconnect mains plug when :
  – the red light below the TV screen is flashing continuously.
  – a bright white line is displayed across the screen.
  – cleaning the TV screen. Never use abrasive cleaning agents. Use a slight damp chamois leather or soft cloth.
  – there is a lightning storm.
  – the set is left unattended for a prolonged period of time.
- No naked flame sources, such as lighted candles, should be placed on top of the TV or in the vicinity.
- Do not place your TV set under direct sunlight or heat.
- Leave at least 5 cm around each side of TV set to allow for proper ventilation.
- Avoid placing your set (e.g. near the window) where it is likely to be exposed to rain or water.
- No objects filled with liquids should be placed on top the TV so as to avoid dripping or splashing of liquids on the set.

Useful Tips

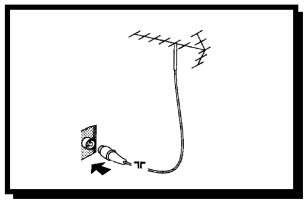
- Do not leave your set on standby mode for a prolonged period of time. Switch off set to allow it to be demagnetised. A demagnetised set supports good picture quality.
- Do not shift or move the set around when it is switched on. Uneveness in colour in some parts of the screen may occur.
- Never attempt to repair a defective TV yourself. Always consult a skilled service personnel.

Before Calling Service

Below is a list of frequently occurred symptoms. Before you call for service, make these simple checks. Some of these symptoms can easily be rectified if you know what to do.

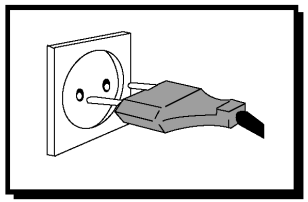
Symptom	What you should do
Colour patch (uneveness)	• Switch off the TV by the mains power button. Wait for 20 minutes before switching on again. • Check the TV is not placed too near speakers or magnetic objects.
No power	• Check the TV's AC power cord is plugged into the mains socket. If there is still no power, disconnect plug. Wait for 60 seconds and re-insert plug. Switch on the TV again.
No picture	• Check the antenna connection at the rear of the TV. • Possible TV station problem. Try another channel.
Good picture but no sound	• Try increasing the volume. • Check that the sound is not muted. If it is muted, press the **Mute** button on the remote control to restore sound.
Good sound but poor colour or no picture	• Try increasing the contrast and brightness setting.
Snowish picture and noise	• Check antenna connection at the rear of the TV.
Horizontal dotted lines	• Possible electrical interference e.g. hairdryer, vacuum cleaner, etc. Switch off appliances.
Double images or "Ghost" images	• Possible poor positioning of antenna. Using a highly directional antenna may improve reception.
TV not responding to remote control handset	• Check life span of batteries of remote control handset. • Aim remote control handset directly at remote control sensor lens on the TV.

Hooking up Your TV (Basic Connection)



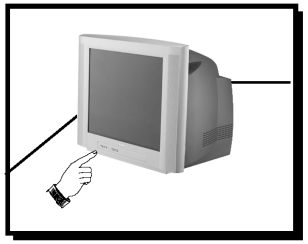
Antenna Connection

- Connect the aerial plug to the antenna socket on the backcover.
- Insert the mains plug into the wall socket.



Mains Connection

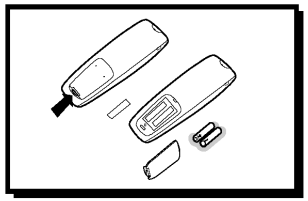
- For correct mains voltage, refer to type sticker at the rear of the TV set
- Consult your dealer if mains supply is different.
  Note : This diagram is not representative of the actual plug and socket.



Switching on the Set

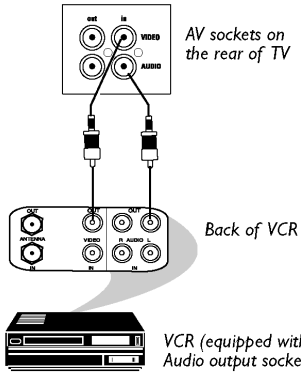
- Press the main power button to switch on/ off the TV.
- If the set is on standby (indicator is red), press the **Power** button on the remote control to switch on set.

Use/Care of Remote Control



- Insert the correct type of batteries into the compartment.
- Ensure the batteries are placed in the right direction.

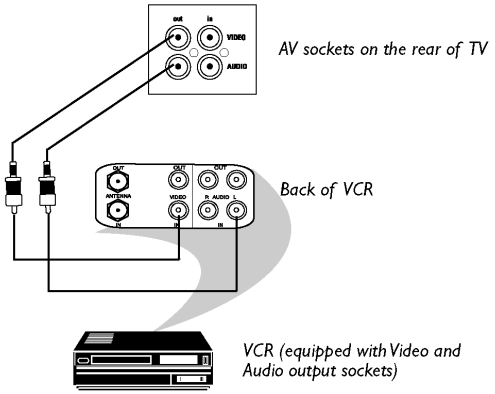
Connecting the Audio/Video Sockets (Playback)



You can view the playback of VCR tapes (Video Disc players, camcorders, etc.) by using the AUDIO and VIDEO INPUT sockets on the rear of the TV.

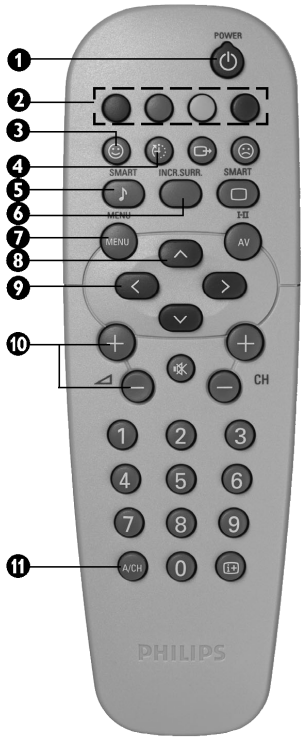
– Connect the **VIDEO** and **AUDIO IN** sockets on the rear of the TV to the **AUDIO** and **VIDEO OUT** sockets on the VCR.

Connecting the Audio/Video Sockets (Recording)



– Connect the sockets of the VCR which you wish to record from, to the corresponding **AV** sockets.

Functions of Remote Control



1 Power button
- Switch set off temporarily to standby mode. (The red light indicator lights up when the set is on standby mode).
- To switch on set from standby mode, press Channel +/– , Digit (0 -9) or Power button.

2 Personal Zapping buttons
As Personal Zapping buttons, you can surf up to 10 personal channels for each button. For detailed description of functions, refer to section on "Personal Zapping ".

3 Smiley button
Allows to add and store your personal preference channels in your Personal Preference list. For detailed description of functions, refer to section on "Using your Personal Zapping feature".

4 Sleeptimer Button
Allows you to select a time period after which the set will switch to standby mode automatically.

5 Smart Sound Button
Press the Smart Sound button repeatedly to access 4 different types of sound settings and choose your desired setting.

6 Incredible Surround Button
- Allows you to select Incredible Surround sound when transmission is in stereo mode.
- Allows you to select Spatial Sound when transmission is in mono mode.

7 Menu Button
Displays the main menu. Also exits menu from screen.

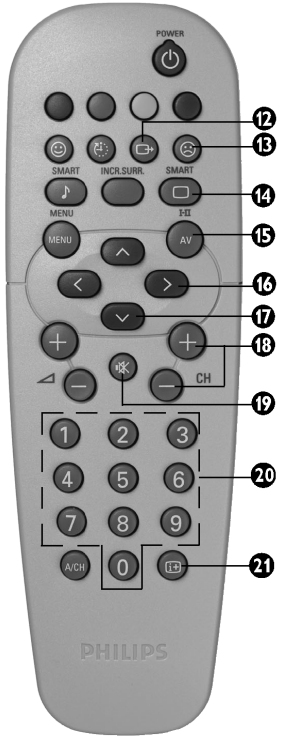
8 Cursor Up Button
Allows you to select the next item on the menu.

9 Cursor Left Button
Allows you to select the sub-menus and adjust the settings.

10 Volume + / – Button
Increases or decreases volume.

11 A/CH(Alternate channel) Button
Allows you to change between the current channel and the previous channel.

Functions of Remote Control



12 A/V Button
Allows you to select the AV channels.

13 Frownie button
Allows to delete stored personal preference channels in your Personal Preference list. For detailed description of functions, refer to section on "Personal Zapping ".

14 Smart Picture Button
Press the Smart Picture button repeatedly to access 5 different types of picture settings and choose your desired setting.

15 SAP
Not Applicable.

16 Cursor Right Button
Allows you to access the sub-menus and adjust the settings.

17 Cursor Down Button
Allows you to select the next item on the menu.

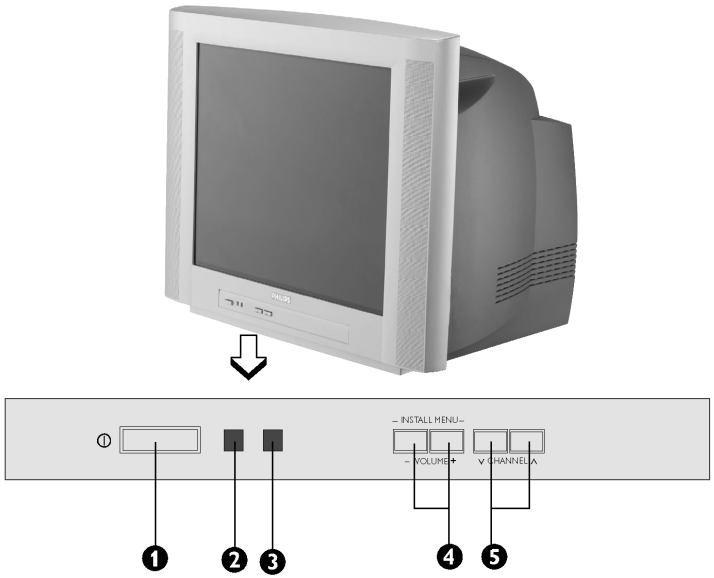
18 Channel + / – Buttons
Allows you to select channels in ascending or descending order.

19 Mute Button
Mutes sound. To restore sound, press button again.

20 Digit (0 -9) Buttons
Press to select a channel. For a 2-digit channel number, press the first digit and followed immediately by the second digit.

21 OSD button
Allows you to display the current channel number. It also allows to exit menu from the screen after control adjustments.

Functions of TV Controls



1	Mains Power button	Switch mains power on or off.
2	Standby light indicator	Indicate red light when standby mode is activated.
3	Remote Sensor	Acts as a sensor for activating the controls of the TV when remote control handset is aimed at it.
4	Volume + / – buttons	Adjust sound volume softer/louder.
5	Channel ∨ / ∧ buttons	Select channel in descending/ascending order.

Note

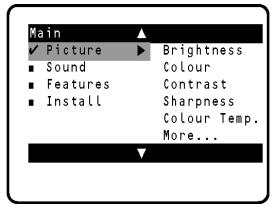
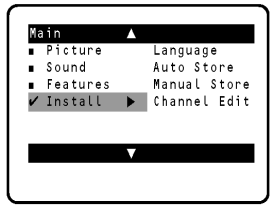
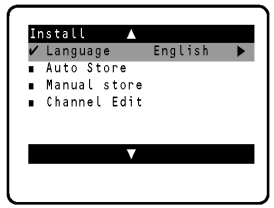
- You can enter the main menu by pressing both the Volume – and + buttons at the same time.
- Press the Channel ∨ or ∧ button to select the next item on the menu.
- Press Volume – or + button to access sub-menu and adjust the settings.

Selecting the Menu Language

Operating instructions generally explains the operation of the TV set using the buttons on the remote control unless otherwise stated. Please read the following instructions carefully and follow the steps as shown to familiarise yourself with the installations and all features available in your set.

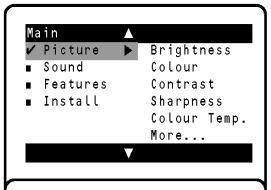
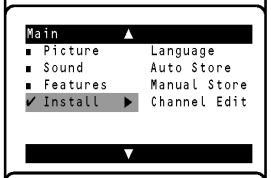
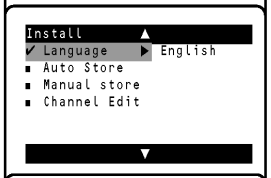
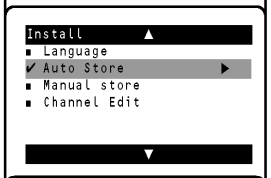
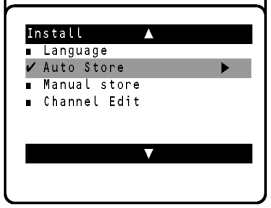
Note: When there is no signal input to the TV, you may encounter instability of the on screen display. In this instance, please use the ⊣⊕ button on your remote control to select an AV channel.

The **Language** feature allows you to set the TV's on-screen menu to be shown in your desired language.

Step	Press button		Result on screen
1	MENU	Enter main menu.	
2	∨	Select **Install**.	
3	>	Enter the Install menu.	
4	>	Press button repeatedly to cycle through the language list and select the language of your choice.	
5	i+	Exit menu from screen.	

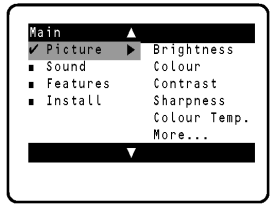
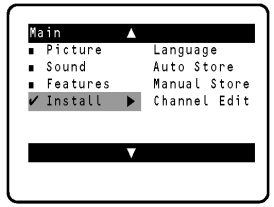
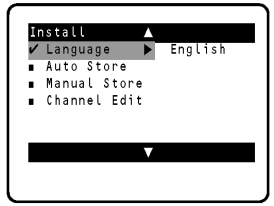
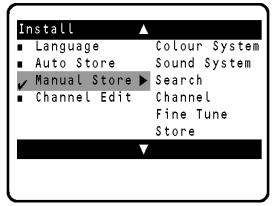
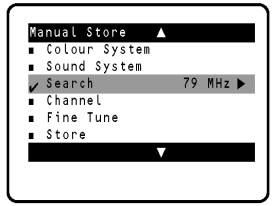
Automatic Tuning of Channels

Automatic tuning of channels allows you to store each programme automatically.

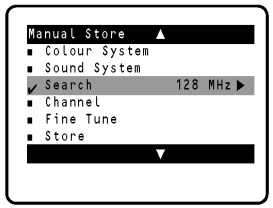
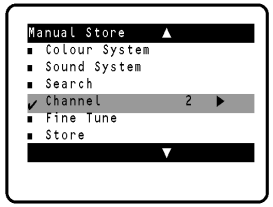
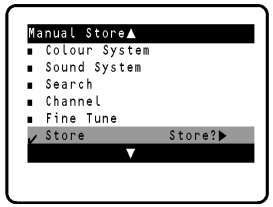
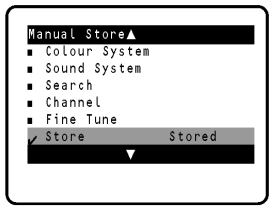
Step	Press button		Result on screen
1	MENU	Enter main menu.	
2	∨	Press button repeatedly until **Install** is selected.	
3	>	Enter install menu.	
4	∨	Select **Auto Store**.	
5	>	Start automatic tuning of channels.	
6	i+	When tuning is completed, exit menu from screen.	

Manual Tuning of Channels

Manual tuning of channels allows you to select your preferred channel number for every available programme.

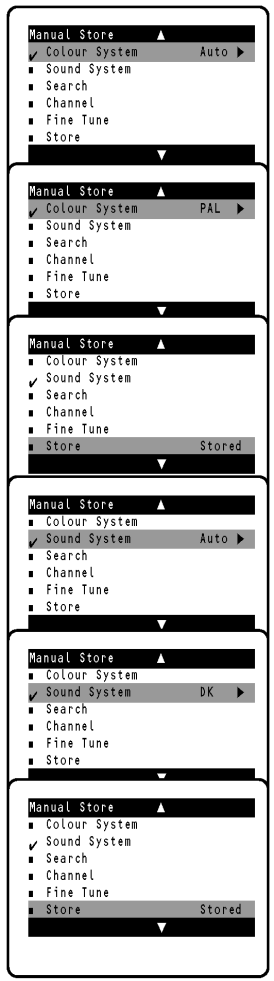
Step	Press button		Result on screen
1	MENU	Enter main menu.	
2	∨	Press button repeatedly until **Install** is selected.	
3	>	Enter install menu.	
4	∨	Press button repeatedly until **Manual Store** is selected.	
5	>	Enter manual store menu.	
6	∨	Press button repeatedly until **Search** is selected.	

MANUAL TUNING OF CHANNELS

Step	Press button		Result on screen
7	>	Start manual searching. Searching stops once a transmitting signal is found.	
8	v	Select **Channel**.	
9	1 2 3 4 5 6 7 8 9 0	Key in the channel number.	
10	v	Press button repeatedly until **Store** is selected.	
11	>	Store tuned channel. **Note** : If you want to continue searching for another transmitting channel, repeat steps 7 to 11.	
12	i+	Exit menu from screen.	

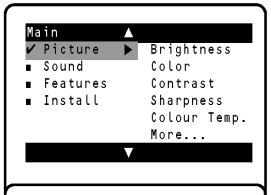
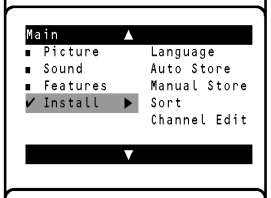
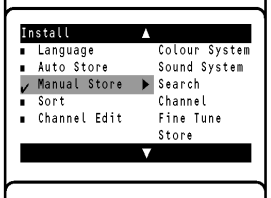
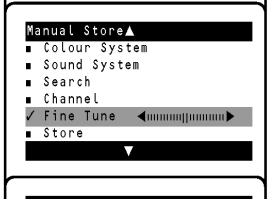
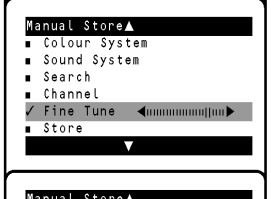
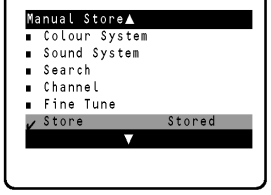
SELECTING THE COLOUR/SOUND SYSTEM

This feature allows you to select your desired **Colour** and **Sound** system. If **Auto** is selected, the respective colour and sound system will be automatically selected according to the transmission system. **Note** : Select your desired colour and sound system manually if reception is poor at **Auto** mode.

Step	Press button		Result on screen
Repeat **step 1** to **step 5** as in **"Manual Tuning of TV Channels"**		**Colour System** is selected.	
6	< or >	Select the desired colour system (**Auto**, **PAL**, **NTSC 3.58**, **NTSC 4.43** or **SECAM**).	
7	v	Press button repeatedly until **STORE** is selected.	
8	>	Store selected system.	
9	v or ^	Proceed to select **Sound System**.	
10	< or >	Select the desired sound system (**Auto, BG, I** or **DK.**	
11	v	Press button repeatedly until **STORE** is selected.	
12	>	Store selected system.	
13	i+	Exit menu from screen.	

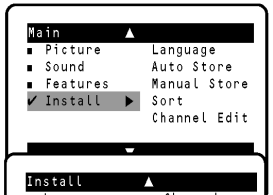
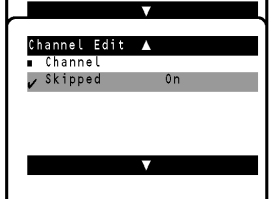
Fine Tuning of Channels

This feature allows you to adjust picture reception in areas of weak reception.

Step	Press button		Result on screen
1	MENU	Enter main menu.	
2	∨	Press button repeatedly until **Install** is selected.	
3	>	Enter install menu.	
4	∨	Press button repeatedly until **Manual Store** is selected.	
	>	Enter manual store menu.	
6	∨	Press button repeatedly until **Fine Tune** is selected.	
7	> or <	Fine tune until the best reception is obtained.	
8	∨	Select **Store**.	
9	>	Store last fine-tuned status.	
10	i+	Exit menu from screen.	

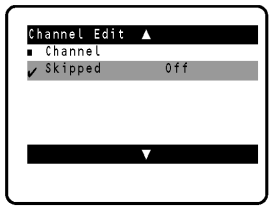
Editing of Channels

This feature allows you to skip or edit channels which have bad or weak TV signal or channels that you do not watch often. **Note** : Once a channel is skipped, you cannot have access to it by the CH (Channel) + or – button. You can only have access to the channel by the Digit (0 -9) buttons.

Step	Press button		Result on screen
1	MENU	Enter main menu.	
2	∨	Press button repeatedly until **Install** is selected.	
3	>	Enter install menu.	
4	∨	Press button repeatedly until **Channel Edit** is selected.	
5	>	Enter **Channel Edit** menu.	
6	1 2 3 4 5 6 7 8 9 0	Key in the channel number to be skipped.	
7	∨	Select **Skipped**.	
8	>	Select **On** to skip channel.	
9	i+	Exit menu from screen.	

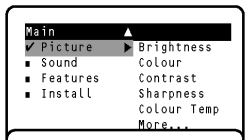
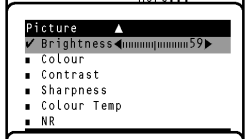
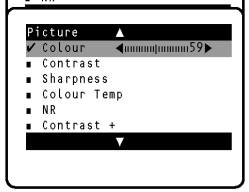
How to Restore Skipped Channels

- Repeat **Steps 1** to **5** as in"**Editing of Channels**".
- Key in the channel number to be restored by the **Digit (0 - 9)** button.
- Select **Skipped** by the ∨ button.
- Select **Off** to restore channel by the > button.
- Exit menu from screen by the i+ button.



ADJUSTING THE TV PICTURE

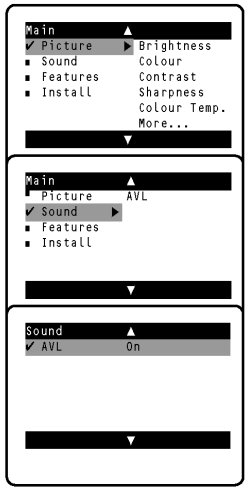
The picture menu allows you to make adjustments to the picture.

Step	Press button		Result on screen
1	MENU	Display the main menu on screen.	
2	>	Enter **Picture** menu.	
3	^ or v	Select item.	
4	< or >	Adjust level or select desired setting.	
5	i+	Exit menu from screen.	

Picture menu items	Activities
Brightness	Increase or decrease brightness level.
Colour	Increase or decrease color level.
Contrast	Increase or decrease contrast level.
Sharpness	Increase or decrease sharpness level to improve detail in picture.
Colour temperature	Choose from 3 settings (Normal, Warm or Cool).
NR (Noise Reduction)	Select "**On**" to reduce "noisy" picture (little dots on picture) due to weak signal.
Contrast +	Select "**On**" to allow you to optimise the total contrast for improved picture quality.

ADJUSTING THE TV SOUND

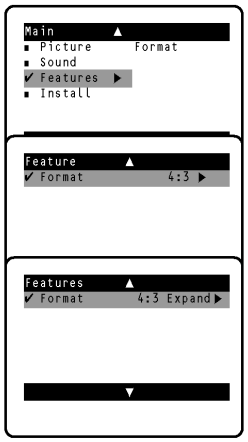
The sound menu allows you to make adjustments to Auto Volume leveller (AVL). This feature enables volume to remain at a pre-determined level should there be a sudden change in volume during commercial breaks or channel switching.

Step	Press button		Result on screen
1	MENU	Display the main menu on screen.	
2	v	Select **Sound** menu.	
3	>	Enter **Sound** menu.	
4	< or >	Select **On** to switch on **AVL**.	
5	i+	Exit menu from screen.	

USING THE SCREEN FORMAT

You can have a choice of two formats for your viewing pleasure, namely : - **4:3** mode and the **EXPAND 4:3** mode through the **FORMAT** menu.

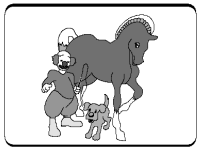
Step	Press button		Result on screen
1	MENU	Display the main menu on screen.	
2		Press button repeatedly until **Features** is selected.	
3		Enter the Features menu.	
4		Press button repeatedly until **Format** is selected.	
5		Press the button repeatedly to cycle through the different formats (**4:3** or **Expand 4:3**) or and select your desired format.	
6		Exit menu from screen.	



When to use the Screen Formats

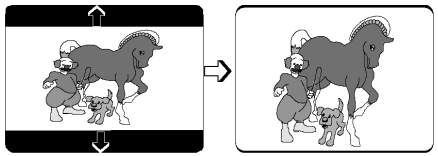
4:3 format

Select the 4:3 format if you want to display the 4:3 picture using the full surface of the screen.



Expand 4:3 format

Select the Expand 4:3 format if you want to expand movie images recorded in the letterbox format. When this format is selected, the black horizontal bars at the top and bottom are expanded thus filling up the entire TV screen.



SMART PICTURE CONTROL

Whether you are watching a movie or video game, your TV has automatic video control settings matched to your current program source or content. The Smart Picture feature quickly resets your TV's video controls of program for a number of different types of programs and viewing conditions you may have in your home. Each Smart Picture setting is preset at the factory to automatically adjust the TV's Brightness, Colour, Picture and Sharpness levels.

Step	Press button	
1		Press botton repeatedly to cycle through the 5 settings namely, **Personal**, **DVD/VCD**, **Rich**, **Natural** and **Soft** and select your desired picture setting.
2		Exit menu from screen.

Defintion of Picture Settings

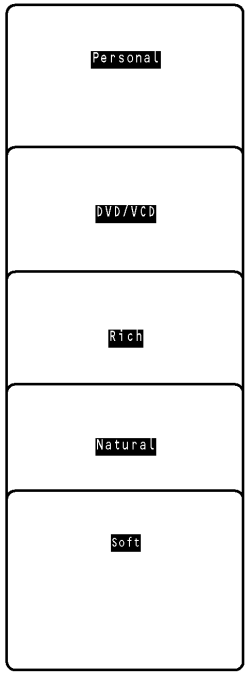
Personal : Picture settings are set to your preference.

DVD/VCD : For optimal picture setting, whenever the source is connected to DVD/VCD player, select DVD/VCD setting for AV mode.

Rich : Emphasize very vibrant colours. This setting is the optimal setting when you are viewing TV programmes in a brightly-lit room.

Natural : Emphasize original colours.

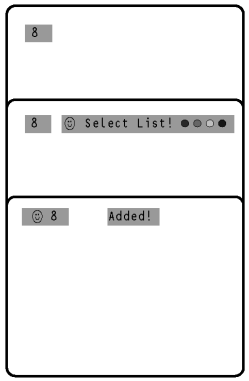
Soft : Emphasize "warm" colours. (Suitable for dimly-lit room condition and gives cinema-like effect when light is switched off).



PERSONAL ZAPPING

A list or series of favourite TV programs can be selected and stored in the 4 coloured buttons with the Personal Zapping feature. With this feature you can easily viewed up to a total of 10 preferred channels for each coloured button.

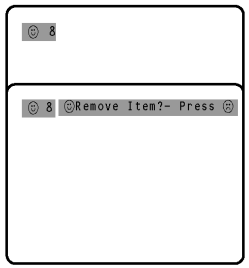
Adding Channels to the Favourite list

Step	Press button		Result on screen
1	1 2 3 4 5 6 7 8 9 0	Select a channel by the Digit buttons	
2	☺	Press button to display list.	
3	● ● ○ ●	Choose your favourite colour button to store selected channel. Repeat steps 1 to 3 to add and store your avourite channels to the list.	
4	i+	Exit menu from screen.	

To view through the favourite list

1	● ● ○ ●	Press the colour button that you have selected.
2	● ● ○ ●	Press button repeatedly to cycle through your favourite list and view your favourite channel.

Deleting Channels from the Favourite list

1	● ● ○ ●	Select a colour button and press button repeatedly to select the channel you want to delete.	
2	☹	Press button to display list.	
3	☹	Press button to remove item. Repeat steps 1 to 3 to delete more channels from list.	
4	i+	Exit menu from screen.	

Personal Notes:

4. Mechanical Instructions

Index of this chapter:
1. Set Disassembly
2. Service Positions
3. Assy/Board Removal
4. Set Re-assembly

Note: Figures below can deviate slightly from the actual situation, due to different set executions.

4.1 Set Disassembly

1. Remove all fixation screws of the rear cover (do not forget the screws that hold the rear connection panel).
2. Now pull the rear cover backwards to remove it.

4.2 Service Positions

There are 2 configurations possible. With and without panel bracket. Both have a different service position:

Main panel without bracket (with integrated 'control' part).
1. Disconnect the strain relief of the AC power cord.
2. Remove the main panel, by pushing the two center clips outwards [1]. At the same time pull the panel away from the CRT [2].
3. Disconnect the degaussing coil by removing the cable from (red) connector 0212.
4. Turn the panel 90 degrees counter clockwise [3].
5. Flip the panel 90 degrees [4], with the components towards the CRT.
6. Turn the panel with its rear connections towards the CRT [5].
7. Slide the metal heatsink (near the mains transformer 5520) underneath the right chassis bracket. This secures the panel [6].

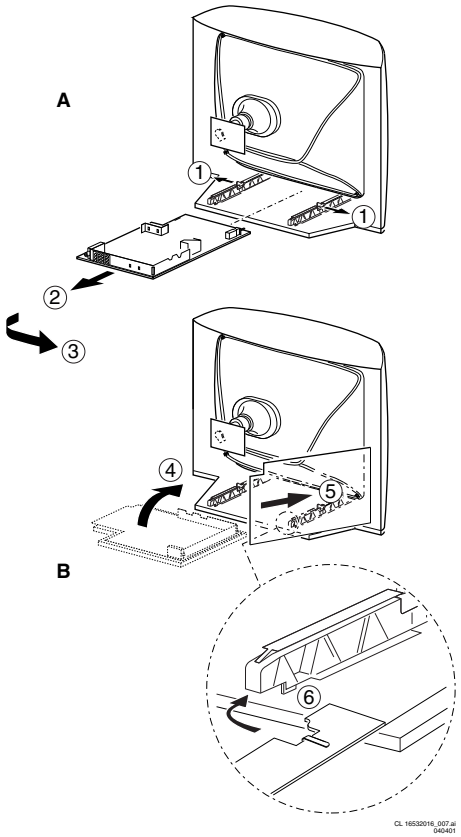


Figure 4-1 Service position (1)

Main panel with bracket (with separate 'control' part).
1. Disconnect the strain relief of the AC power cord.
2. Disconnect the degaussing coil by removing the cable from (red) connector 0212 [1].
3. Remove the panel bracket from the bottom tray, by pulling it backward [2].
4. Turn the chassis tray 90 degrees counter clockwise [2].
5. Move the panel somewhat to the left and flip it 90 degrees [3], with the components towards the CRT.
6. Turn the panel with the rear I/O towards the CRT.
7. Place the hook of the tray in the fixation hole of the cabinet bottom [4] and secure it.

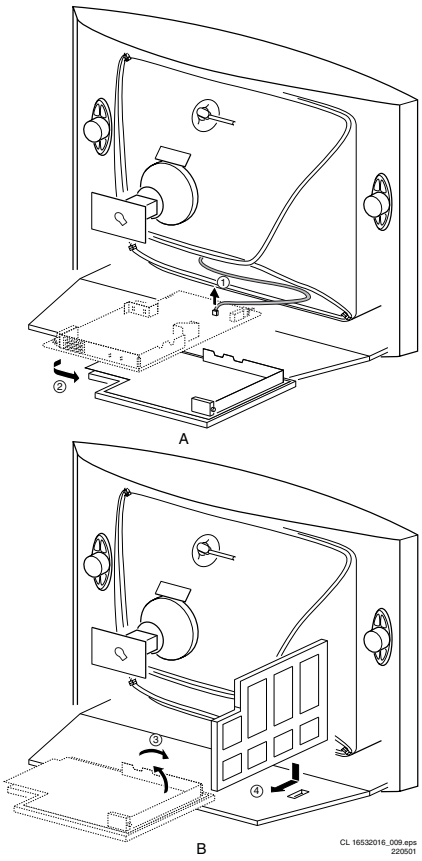


Figure 4-2 Service position (2)

4.3 Assy/Board Removal

4.3.1 Comb Filter Assy/ Board (if present)

You can remove the Comb Filter panel from the Main Carrier board, by disconnecting it from connector 1810 (located nearby the mains transformer 5520).

4.3.2 Top Control Assy/Board (if present)

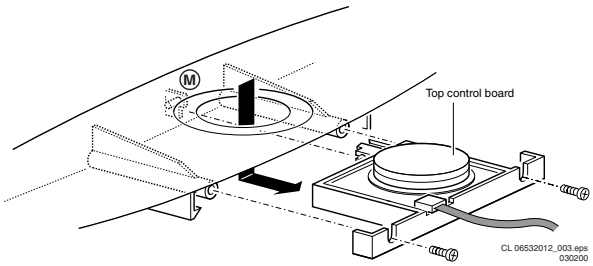


Figure 4-3 Top control removal

1. Remove the two fixation screws (if present).
2. Pull the module down and backwards (w.o.w. release it from the front hinge [M]). You must use some force.
3. Lift the board from its bracket while releasing the two fixation clamps. The board hinges on the other side.

4.3.3 Front Interface Assy/ Board (if present)

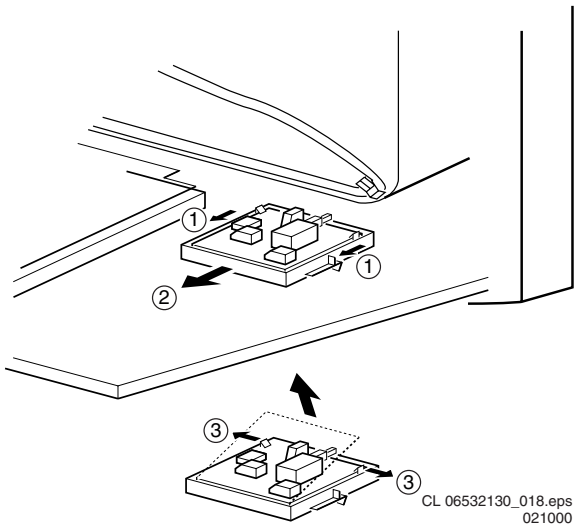


Figure 4-4 Front interface removal

1. You can remove the complete module from the bottom plate, by pulling the two fixation clamps upwards [1] while sliding the module away from the CRT [2].
2. Release the 2 fixation clamps [3] at the side of the bracket, and lift the board out of the bracket (it hinges at one side).

4.3.4 DAF Assy/ Board (if present)

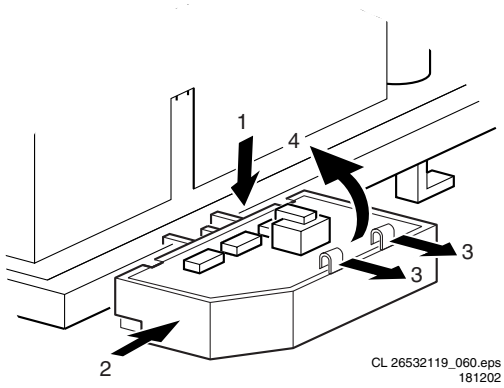


Figure 4-5 DAF panel removal

1. You can remove the complete module from the Main Carrier bracket, by pressing its fixation clamp downwards [1] while sliding the module in the direction of the CRT [2].
2. Release the 2 fixation clamps [3] to lift the board out of the bracket [4].

4.3.5 Side I/O Assy/ Board (if present)

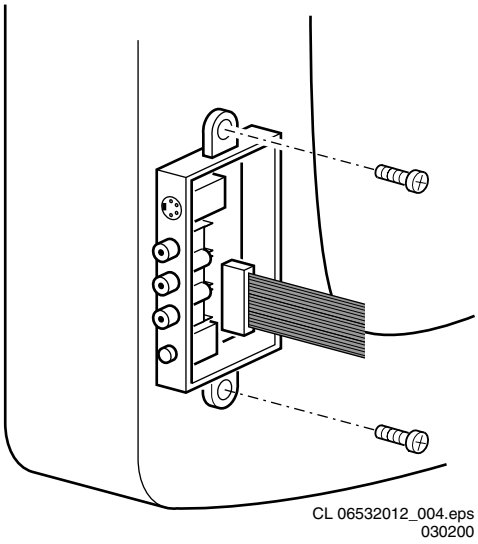


Figure 4-6 Side jack panel removal

1. You can remove the complete Side I/O assembly after removing the 2 fixation screws.
2. Release the 2 fixation clamps to lift the board out of the bracket.

4.4 Set Re-assembly

Before you mount the rear cover, perform the following checks:

1. Check whether the AC power cord is mounted correctly in its guiding brackets.
2. Re-place the strain relief of the AC power cord into the cabinet.
3. Check whether all cables are replaced in their original position.

5. Service Modes, Error Codes and Fault Finding

Index:

1. Test points.
2. Service Modes.
3. Problems and Solving Tips (related to CSM).
4. Compair
5. Error Codes.
6. The Blinking LED Procedure.
7. Protections.
8. Repair Tips.

5.1 Test Points

The chassis is equipped with test points printed on the circuit board assemblies. These test points refer to the functional blocks:

Table 5-1 Test Point Overview

TEST POINT	CIRCUIT	DIAGRAM
A1-A2-A3-..	AUDIO PROCESSING	A8, A9
C1-C2-C3-..	CONTROL	A7
F1-F2-F3-..	FRAME DRIVE & OUTPUT	A3
I1-I2-I3-..	TUNER & IF	A4
L1-L2-L3-..	LINE DRIVE & OUTPUT	A2
P1-P2-P3-..	POWER SUPPLY	A1
S1-S2-S3-..	SYNCHRONISATION	A6
V1-V2-V3-..	VIDEO PROCESSING	A5, B1

The numbering is in a logical sequence for diagnostics. Always start diagnosing within a functional block in the sequence of the relevant test points for that block.

Perform measurements under the following conditions:
- Service Default Alignment Mode.
- Video: colour bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

Service Default Alignment Mode (SDAM) offers several features for the service technician, while the Customer Service Mode (CSM) is used for communication between dealer and customer.
There is also the option of using ComPair, a hardware interface between a computer (see requirements) and the TV chassis. It offers the ability of structured trouble shooting, error code reading and software version readout for all chassis.
Requirements: To run ComPair on a computer (laptop or desktop) requires, as a minimum, a 486 processor, Windows 3.1 and a CD-ROM drive. A Pentium Processor and Windows 95/98 are also acceptable (see also paragraph 5.4).

Table 5-2 SW Cluster

SW Cluster	Software mane	UOC type	UOC Diversity	Special Features
L3LAN1	L01AN4x.y	TDA9582 (LS)	64K ROM Size	China
L3LAN2	L01AN5x.y	TDA9582 (LS)	64K ROM Size	India, M.E.
L3LAN3	L01AN7x.y	TDA9570 (LS)	55K ROM Size	China, AV stereo
L3LAT1	L01AT5x.y	TDA9552 (LS)	64K ROM Size	1pg TXT, AV stereo
L3LAC1	L01AC2x.y	TDA9580 (LS)	64K ROM Size	NTSC, Tai Wan, Korean
Abbreviations in Software name: A = AP, T = TXT, N = NON TXT, C = NTSC, M = MONO, D = DVD				

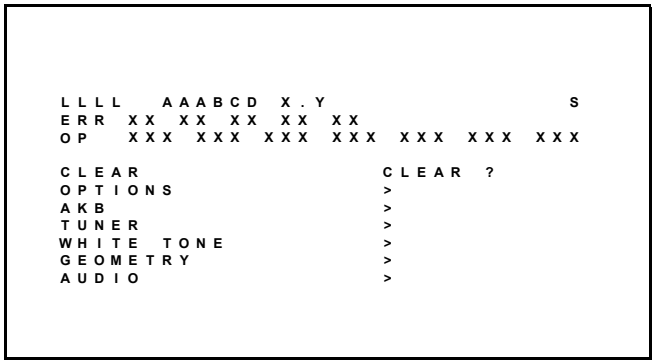
5.2.1 Service Default Alignment Mode (SDAM)

Purpose
- To change option settings.
- To create a predefined setting to get the same measurement results as given in this manual.
- To display / clear the error code buffer.
- To override SW protections.
- To perform alignments.
- To start the blinking LED procedure.

Specifications
- Tuning frequency:
  - 475.25 MHz for PAL/SECAM (AP-PAL).
  - 61.25 MHz (channel 3) for NTSC-sets (AP-NTSC).
- Colour system:
  - PAL-BG for AP-PAL.
  - NTSC for AP-NTSC.
- All picture settings at 50 % (brightness, colour contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled, like:
  - (sleep) timer,
  - child/parental lock,
  - blue mute,
  - hotel/hospitality mode
  - auto switch-off (when no “IDENT” video signal is received for 15 minutes),
  - skip / blank of non-favorite presets / channels,
  - auto store of personal presets,
  - auto user menu time-out.
- Operation hours counter.
- Software version.
- Option settings.
- Error buffer reading and erasing.
- Software alignments.

How to enter SDAM
Use one of the following methods:
- Use a standard customer RC-transmitter and key in the code 062596 directly followed by the “M” (menu) button or
- Short jumper wires 9631 and 9641 on the mono carrier (see Fig. 8-1) and apply AC power. Then press the power button (remove the short after start-up).
- Caution: Entering SDAM by shorten wires 9631 and 9641 will override the +8V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could lead to damaging the set.
- Or via ComPair.

After entering SDAM, the following screen is visible, with S at the upper right side for recognition.



CL 26532046_078.eps
260402

Figure 5-1 SDAM menu

LLLL
This is the operation hours counter. It counts the normal operation hours, not the standby hours.
AAABCD-X.Y
This is the software identification of the main micro controller:
A = the project name (L01).
B = the region: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM.
C = the feature of software diversity: C = NTSC, D = DVD, N = no TXT, T = TXT.
D = the language cluster number:
X = the main software version number.
Y = the sub software version number.
S
Indication of the actual mode. S= SDAM= Service Default Alignment mode.
Error buffers
Five errors possible.
Option bytes
Seven codes possible.
Clear
Erase the contents of the error buffer. Select the CLEAR menu item and press the CURSOR RIGHT key. The content of the error buffer is cleared.
Options
To set the Option Bytes. See chapter 8.3.1 for a detailed description.
AKB
Disable (0) or enable (1) the “black current loop” (AKB = Auto Kine Bias).
Tuner
To align the Tuner. See chapter 8.3.2 for a detailed description.
White Tone
To align the White Tone. See chapter 8.3.3 for a detailed description.
Geometry
To align the set geometry. See chapter 8.3.4 for a detailed description.
Audio
To align the Audio. See chapter 8.3.5 for a detailed description.

How to navigate
- In SDAM, select menu items with the CURSOR UP/DOWN key on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the CURSOR UP/DOWN key to display the next / previous menu items.
- With the CURSOR LEFT/RIGHT keys, it is possible to:
  – Activate the selected menu item.
  – Change the value of the selected menu item.
  – Activate the selected submenu.
- When you press the MENU button twice, the set will switch to the normal user menus (with the SDAM mode still active in the background). To return to the SDAM menu press the OSD / STATUS button.
- When you press the MENU key in a submenu, you will return to the previous menu.

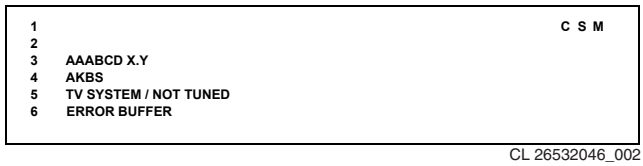
How to store settings
To store settings leave the SDAM (at top level SDAM main menu) with the Standby button on the remote.

How to exit
Switch the set to STANDBY by pressing the power button on the remote control (if you switch the set 'off' by removing the AC power, the set will return in SDAM when AC power is re-applied). The error buffer is not cleared.

5.2.2 Customer Service Mode (CSM)

Purpose
When a customer is having problems with his TV-set, he can call his dealer. The service technician can than ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severness of the complaint. In many cases, he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer.
The CSM is a read only mode; therefore, modifications in this mode are not possible.

How to enter
To enter the CSM by pressing user remote control and key in the code123654.
After switching ON the Customer Service Mode, the following screen will appear:



CL 26532046_002
040402

Figure 5-2 CSM menu

- Indication of the actual mode CSM = Customer Service Mode
- Reserved.
- Software identification of the main micro controller (see paragraph 5.2.1 for the explanation)
- Reserved item.
- Indicates TV system and or not receiving an “IDENT” signal on the selected source. It will display “NOT TUNED”
- Error code buffer (see paragraph 5.4 for more details). Displays the last five errors of the error code buffer.

How to exit
Use one of the following methods:
- Press one of the buttons “Menu”, “OSD” or “Standby” of the remote control keys.
- Switch-off the TV set with the AC power switch.

5.3 Problems and Solving Tips (Related to CSM)

5.3.1 Picture Problems

Note: Below described problems are all related to the TV settings. The procedures to change the value (or status) of the different settings are described.

No colours / noise in picture
Check CSM line 5. Wrong colour system installed. To change the setting:
1. Press the MENU button on the remote control.
2. Select the INSTALLATION sub menu.
3. Select and change the SYSTEM setting until picture and sound are correct.
4. Select the STORE menu item.

Colours not correct / unstable picture
Check CSM line 5. Wrong colour system installed. To change the setting:
1. Press the MENU button on the remote control.
2. Select the INSTALLATION sub menu.
3. Select and change the SYSTEM setting until picture and sound are correct.
4. Select the STORE menu item.

Picture too dark or too bright
Increase / decrease the BRIGHTNESS and / or the CONTRAST value when:
- The picture improves after you have pressed the “Smart Picture” button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new “Personal” preference value is automatically stored.

White line around picture elements and text
Decrease the SHARPNESS value when:
- The picture improves after you have pressed the “Smart Picture” button on the remote control.

The new “Personal” preference value is automatically stored.

Snowy picture
Check CSM line 5. If this line indicates “Not Tuned”, check the following:
- No or bad antenna signal. Connect a proper antenna signal.
- Antenna not connected. Connect the antenna.
- No channel / pre-set is stored at this program number. Go to the INSTALL menu and store a proper channel at this program number.
- The tuner is faulty (in this case the CODES line will contain error number 10). Check the tuner and replace / repair if necessary.

Snowy picture and/or unstable picture
- A scrambled or decoded signal is received.

Black and white picture
Increase the COLOR value when:
- The picture improves after you have pressed the “Smart Picture” button on the remote control.

The new “Personal” preference value is automatically stored.

Menu text not sharp enough
Decrease the CONTRAST value when:
The picture improves after you have pressed the “Smart Picture” button on the remote control.
The new “Personal” preference value is automatically stored.

5.3.2 Sound Problems

No sound or sound too loud (after channel change / switching on)
Increase / decrease the VOLUME level when the volume is OK after you switched on the CSM. The new “Personal” preference value is automatically stored.

5.4 ComPair

5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (service remote control), which allows faster and more accurate diagnostics. ComPair has three big advantages:
- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself because ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based faultfinding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable.
In case of the L01 chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector (located on the Main panel, see also figure 8-1 suffix D).

The ComPair faultfinding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:
- Automatic (by communication with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I2C level. ComPair can access the I2C bus of the television. ComPair can send and receive I2C commands to the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the TV-set.
- Manually (by asking questions to you): Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions (e.g. Does the screen gives a picture? Click on the correct answer: YES / NO) and showing you examples (e.g. Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the faultfinding process.

By a combination of automatic diagnostics and an interactive question / answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Beside fault finding, ComPair provides some **additional features** like:
- Up or downloading of presets.
- Managing of preset lists.
- If both ComPair and SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink. Example: *Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Monocarrier.*
- Click on the “Panel” hyperlink to automatically show the PWB with a highlighted capacitor C2568.
- Click on the “Schematic” hyperlink to automatically show the position of the highlighted capacitor.

5.4.3 How To Connect ComPair

1. First install the ComPair Browser software (see the Quick Reference Card for installation instructions).
2. Connect the RS232 interface cable between a free serial (COM) port of your PC and the PC connector (marked with “PC”) of the ComPair interface.
3. Connect the AC power adapter to the supply connector (marked with “POWER 9V DC”) on the ComPair interface.
4. Switch the ComPair interface OFF.
5. Switch the television set OFF (remove the AC power).
6. Connect the ComPair interface cable between the connector on the rear side of the ComPair interface (marked with “I2C”) and the ComPair connector on the mono carrier (see figure 8-1 suffix D).
7. Plug the AC power adapter in the AC power outlet and switch on the interface. The green and red LEDs light up together. The red LED extinguishes after approx. 1 second while the green LED remains lit.
8. Start the ComPair program and read the “introduction” chapter.

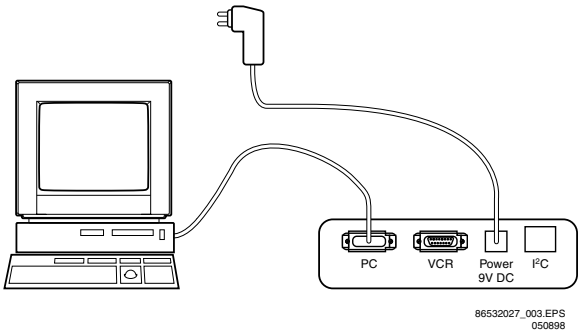


Figure 5-3 Compair connection

5.4.4 How To Order

ComPair order codes:
- Starter kit ComPair32/ SearchMan32 software and ComPair interface (excluding transformer): 3122 785 90450
- ComPair interface (excluding transformer): 4822 727 21631
- Starter kit ComPair32 software (registration version): 3122 785 60040
- Starter kit SearchMan32 software: 3122 785 60050
- ComPair32 CD (update): 3122 785 60070
- SearchMan32 CD (update): 3122 785 60080
- ComPair interface cable: 3122 785 90004

5.4.5 Error Buffer

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is written at the left side and all other errors shift one position to the right.

5.4.6 How To Read The Error Buffer

You can read the error buffer in 3 ways:
- On screen via the SDAM (only if you have a picture). Examples:
  - ERROR: 0 0 0 0 0 : No errors detected
  - ERROR: 6 0 0 0 0 : Error code 6 is the last and only detected error
  - ERROR: 9 6 0 0 0 : Error code 6 was first detected and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See next paragraph.
- Via ComPair.

5.4.7 How To Clear The Error Buffer

The error code buffer is cleared in the following cases:
- By activation of the CLEAR command in the SDAM menu:
- If the content of the error buffer has not changed for 50 hours, it resets automatically.

Note:
When leaving SDAM by disconnecting the set from AC power, the error buffer is not reset.

5.4.8 Error Codes

In case of non-intermittent faults, clear the error buffer before you begin the repair. These to ensure that old error codes are no longer present.
If possible, check the entire contents of the error buffer. In some situations an error code is only the result of another error code and not the actual cause (e.g., a fault in the protection detection circuitry can also lead to a protection).

ERROR	Device	Error description	Check item	Diagram
0	Not applicable	No Error		
1	Not applicable	X-Ray Protection (USA)	2465, 7460	A2
2	Not applicable	Horizontal Protection	7460, 7461, 7462, 7463, 6467	A2
3	TDA8359/ TDA9302	Vertical Protection	VloAux +13v	A2,A3
4	MSP34X5/ TDA9853	MAP I2C identification error	7831	A9
5	TDA95XX	POR 3.3V / 8V Protection	7200, 7560, 7480	A1,A2. A5,A6, A7
6	I2C bus	General I2C bus error	7200, 3624, 3625	A7
7	Not applicable	-	-	-
8	Not applicable	E/W Protection (Large Screen)	7400, 3405, 3406, 3400	A2
9	M24C08	NVM I2C identification error	7602, 3611, 3603, 3604	A7
10	Tuner	Tuner I2C identification error	1000, 7482	A2,A4
11	TDA6107/8	Black current loop protection	7330, RGB amps, CRT	B1,B2
12	M65669	MAP I2C identification error (USA)	7803	P

5.5 The Blinking LED Procedure

Via this procedure you can make the contents of the error buffer visible via the front LED. This is especially useful when there is no picture.

When the SDAM is entered, the LED will blink the contents of the error-buffer.
- n short blinks (n = 1 - 14),
- when all the error-codes are displayed, the sequence finishes with a LED blink of 3 s,
- the sequence starts again.

Example of error buffer: 12 9 6 0 0
After entering SDAM:
- 12 short blinks followed by a pause of 3 s,
- 9 short blinks followed by a pause of 3 s,
- 6 short blinks followed by a pause of 3 s,
- 1 long blink of 3 s to finish the sequence,
- the sequence starts again.

5.6 Protections

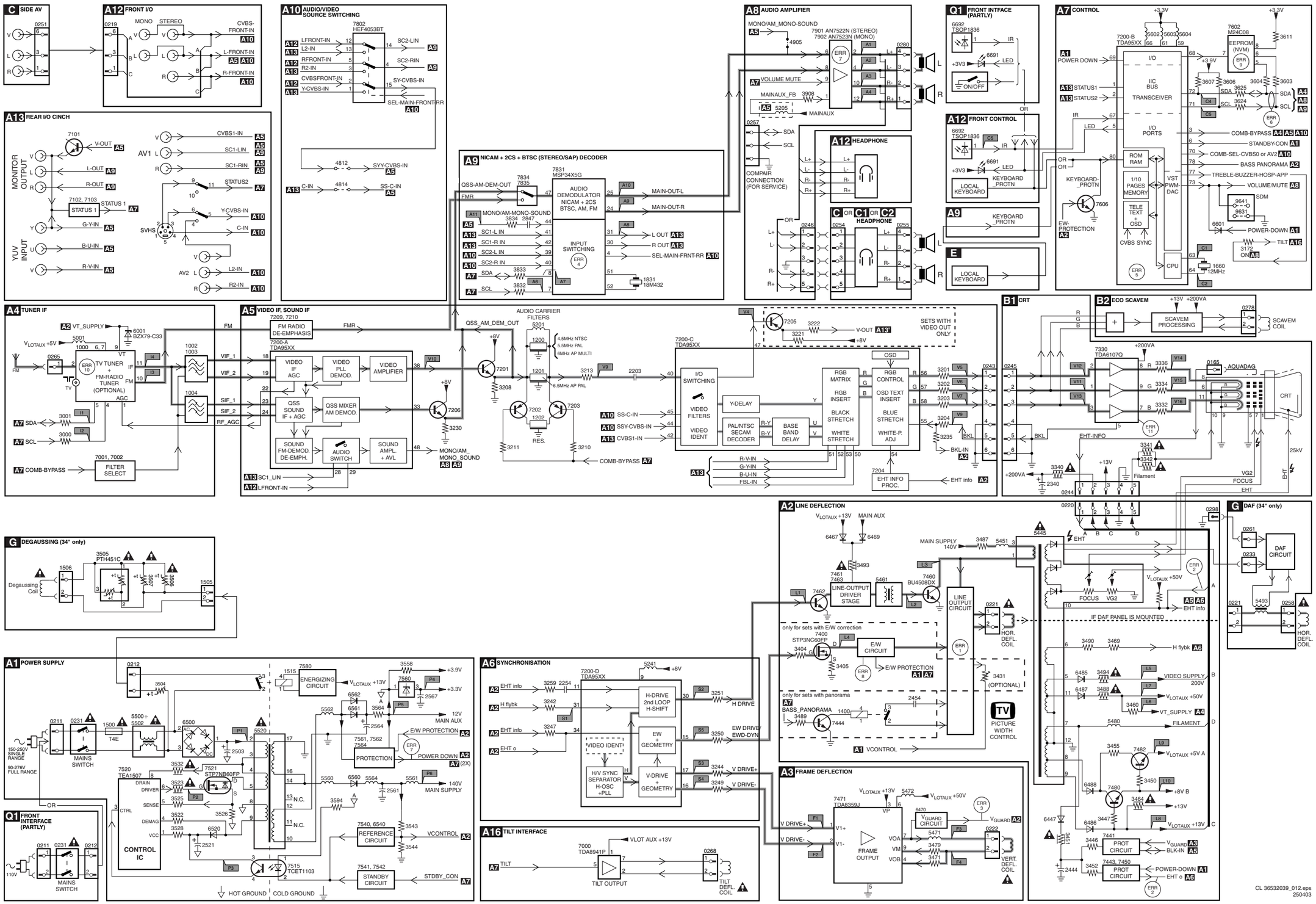
If a fault situation is detected an error code will be generated and if necessary the set will be put in the protection mode. Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases the microprocessor does not put the set in the protection mode. The error codes of the error buffer can be read via the service menu (SDAM), the blinking LED procedure or via ComPair.
To get a quick diagnosis the chassis has two service modes implemented:
- The Customer Service Mode (CSM).
- The Service Default Alignment Mode (SDAM). Start-up of the set in a predefined way and adjustment of the set via a menu and with the help of test patterns.

5.7 Repair Tips

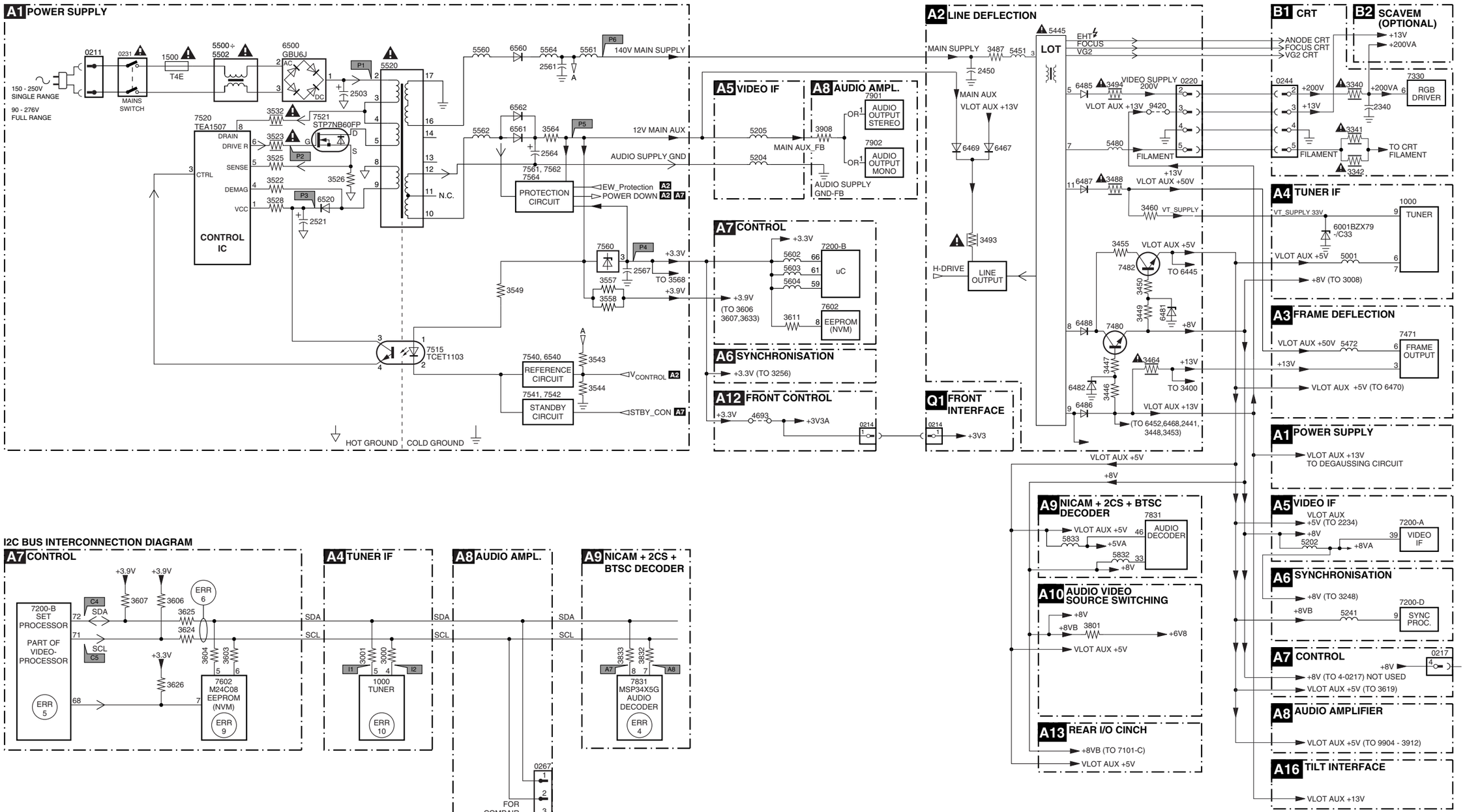
Below some failure symptoms are given, followed by a repair tip.
- **Set is dead and makes hiccuping sound** "MainSupply" is available. Hiccupping stops when de-soldering L5561, meaning that problem is in the "MainSupply" line. No output voltages at LOT, no horizontal deflection. Reason: line transistor 7460 is defective.
- **Set is dead, and makes no sound**Check power supply IC 7520. Result: voltage at pins 1, 3, 4, 5 and 6 are about 180 V and pin 8 is 0 V. The reason why the voltage on these pins is so high is because the output driver (pin 6) has an open load. That is why MOSFET 7521 is not able to switch. Reason: feedback resistor 3523 is defective. **Caution:** be careful measuring on the gate of 7521; circuitry is very high ohmic and can easily be damaged!
- **Set is in hiccup mode and shuts down after 8 s.**Blinking LED (set in SDAM mode) indicates error 5. As it is unlikely that µP "POR" and "+8V protection" happen at the same time, measure the "+8V". If this voltage is missing, check transistor 7480.
- **Set is non-stop in hiccup mode**Set is in over current mode; check the secondary sensing (opto coupler 7515) and the "MainSupply" voltage. Signal "Stdby_con" must be logic low under normal operation conditions and goes to high (3.3 V) under standby and fault conditions.
- **Set turns on, but without picture and sound**The screen shows snow, but OSD and other menus are okay. Blinking LED procedure indicates error 11, so problem is expected in the tuner (pos. 1000). Check presence of supply voltages. As "Vlotaux+5V" at pin 5 and 7 are okay, "VT_supply" at pin 9 is missing. Conclusion: resistor 3460 is defective.
- **Set turns on, but with a half screen at the bottom. Sound is okay**Blinking LED (set in SDAM mode) indicates error 3. Check "Vlotaux+11V" and "+50V". If they are okay, problem is expected in the vertical amplifier IC 7471. Measure with a scope the waveform on pin 17 of the UOC. Measure also at pin 1 of IC 7471. If here the signal is missing, a defective resistor R3244 causes the problem

6. Block Diagram, Supply Voltage, and Testpoint Overview

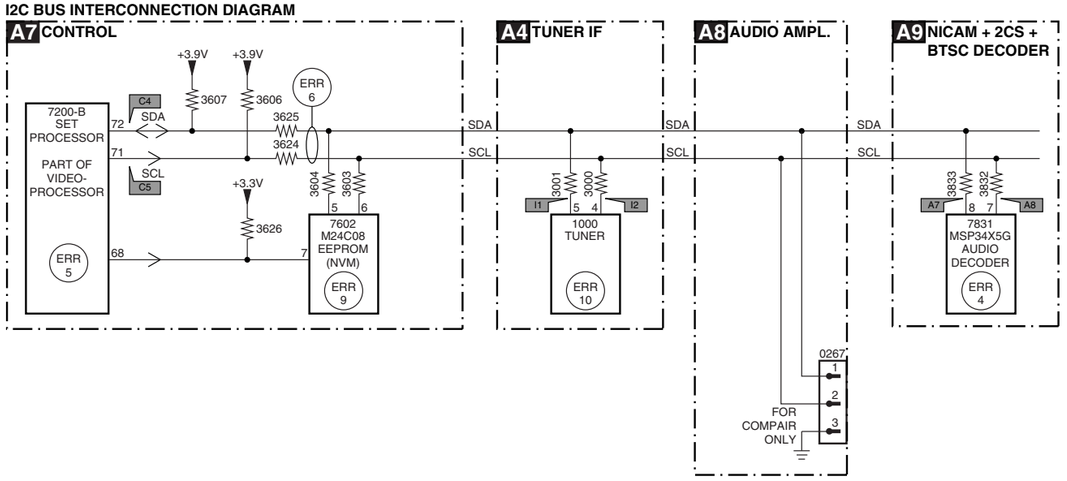
Block Diagram



I²C and Supply Voltage Overview



I2C BUS INTERCONNECTION DIAGRAM



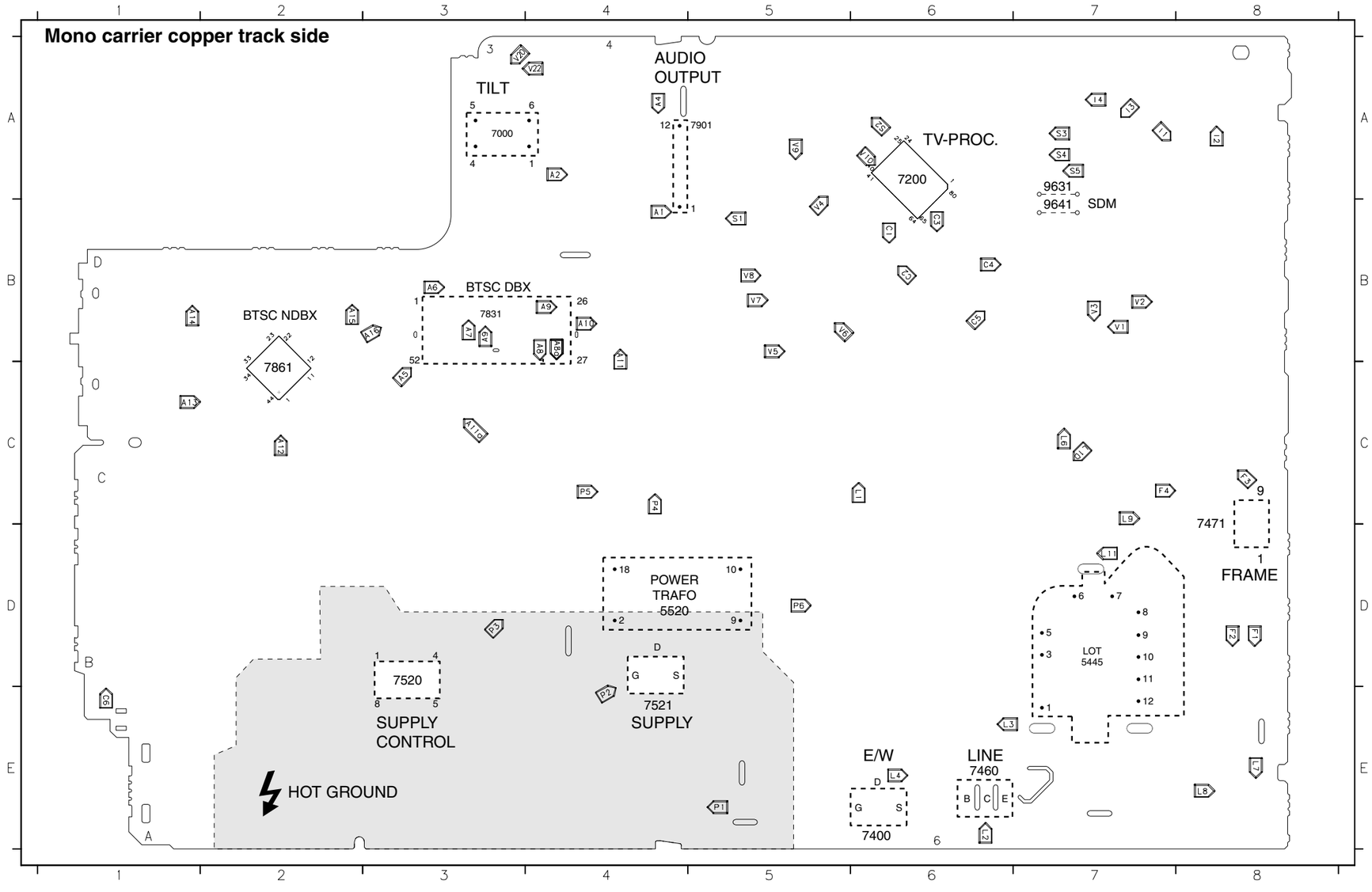
ERROR CODE LIST

Error	Description
0	No error
1	X-Ray / over voltage protection
2	High beam (BCI) protection
3	Vertical guard protection
4	I2C error while communicating with the sound processor
5	Power ON reset (POR bit) 3.3V protection / +8V protection
6	General I2C error
7	Power down (over current) protection
8	EW protection (Large Screen only)
9	I2C error EEPROM error
10	I2C error PLL tuner
11	Black current loop instability protection

CL 26532119_005.eps
101202

Testpoint Overview

Mono carrier copper track side



A1 B4
A2 A4
A3 A5
A4 A4
A5 C3
A6 B3
A7 B3
A8 B4
A8a B4
A9 B4
A10 B4
A11 B4
A11a C3
A12 C2
A13 C2
A14 C1
A15 B2
A16 B2
C1 B6
C2 B6
C3 B6
C4 B6
C5 B6
C6 E1
F1 D8
F2 D8
F3 C8
F4 C7
I1 A7
I2 A8
I3 A7
I4 A7
L1 C6
L2 E6
L3 E7
L4 E6
L6 C7
L7 E8
L8 E8
L9 C7
L10 C7
L11 D7
P1 E5
P2 E4
P3 D3
P4 C4
P5 C4
P6 D5
S1 B5
S2 A6
S3 A7
S4 A7
S5 A7
V1 B7
V2 B7
V3 B7
V4 B5
V5 B5
V6 B5
V7 B5
V8 B5
V9 A5
V10 A6
V20 A3
V22 A4

L01
500mV / div DC
20µs / div

V04
10V / div DC
20µs / div

L02
500mV / div DC
20µs / div

V05
10V / div DC
20µs / div

L03
200V / div DC
20µs / div

V06
10V / div DC
20µs / div

L04
20V / div AC
5ms / div

V07
10V / div DC
20µs / div

L06 33V7 DC
L07 51V DC
L10 8V2 DC
L11 13V DC
P01 148V DC

V08
10V / div DC
5ms / div

P02
20V / div DC
2µs / div

V09
500mV / div DC
10µs / div

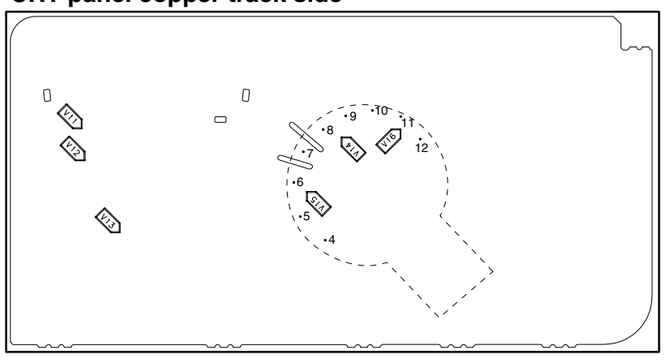
P03 16V1 DC
P04 3V3 DC
P05 12V DC
P06 126V DC

V10
1V / div DC
10µs / div

S01
10V / div DC
20µs / div

S02
10V / div DC
20µs / div

CRT panel copper track side



A01
200mV / div AC
1ms / div

A05
200mV / div AC
1ms / div

A08
200mV / div AC
1ms / div

A10
200mV / div AC
1ms / div

A12
200mV / div AC
1ms / div

A15
10V / div DC
1ms / div

C02
500mV / div DC
1ms / div

C05
10V / div DC
100µs / div

F02
50mV / div DC
5ms / div

I01
0.1V / div DC
200µs / div

S03
500mV / div DC
5ms / div

A02
200mV / div AC
1ms / div

A06
200mV / div AC
1ms / div

A08a
200mV / div AC
1ms / div

A11
200mV / div AC
1ms / div

A13
10V / div DC
20µs / div

A16
10V / div DC
1ms / div

C03
200mV / div DC
1ms / div

C06
10V / div DC
2ms / div

F03
1V / div DC
5ms / div

I02
0.1V / div DC
200µs / div

S04
500mV / div DC
5ms / div

A04
200mV / div AC
1ms / div

A07
200mV / div AC
1ms / div

A09
200mV / div AC
1ms / div

A11a
200mV / div AC
1ms / div

A14
10V / div DC
20µs / div

C01
500mV / div DC
1ms / div

C04
10V / div DC
100µs / div

F01
50mV / div DC
5ms / div

F04
0.2V / div DC
5ms / div

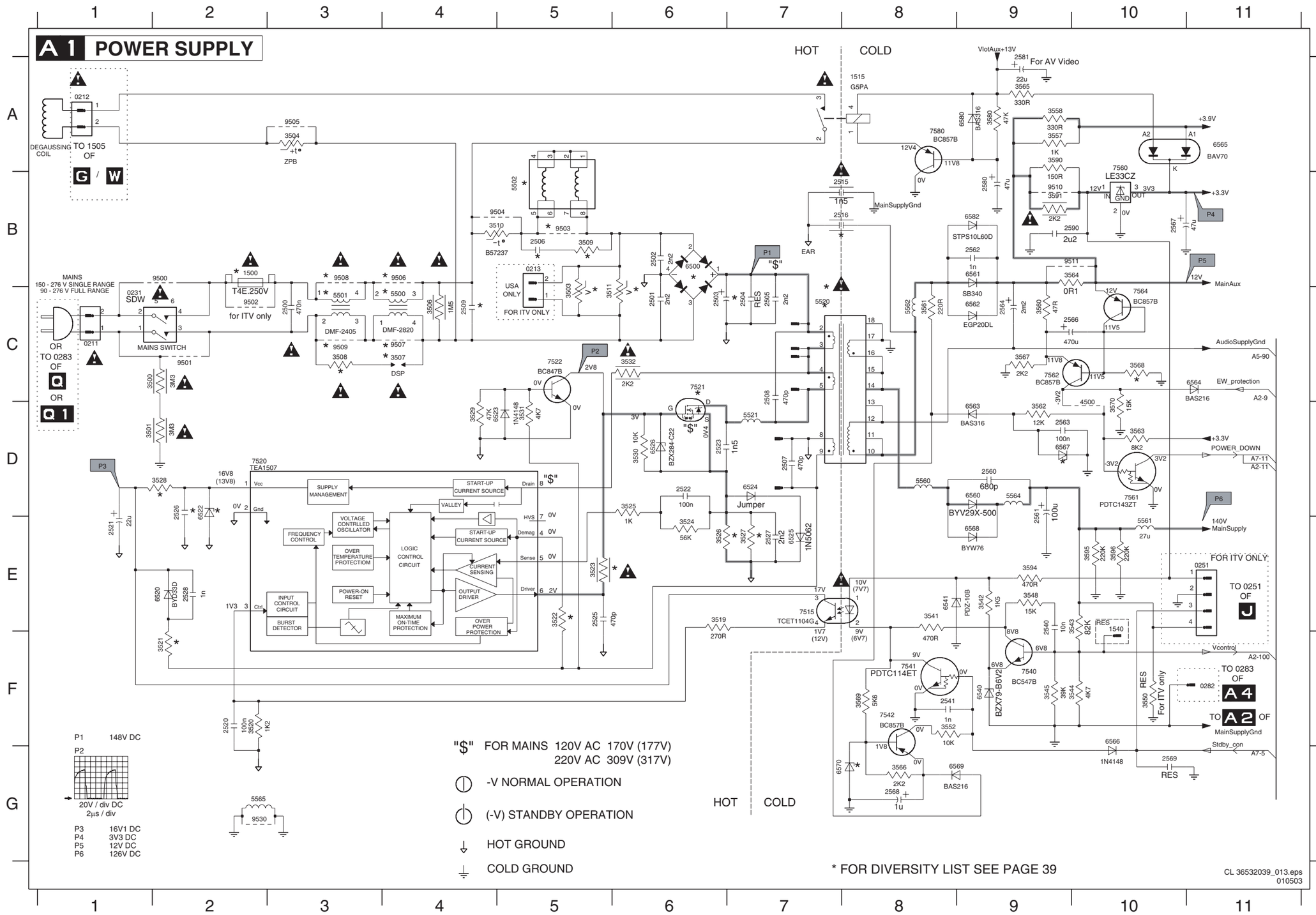
I04
1V / div DC
20µs / div

S05
500mV / div DC
5ms / div

CL 16532119_007.eps
191202

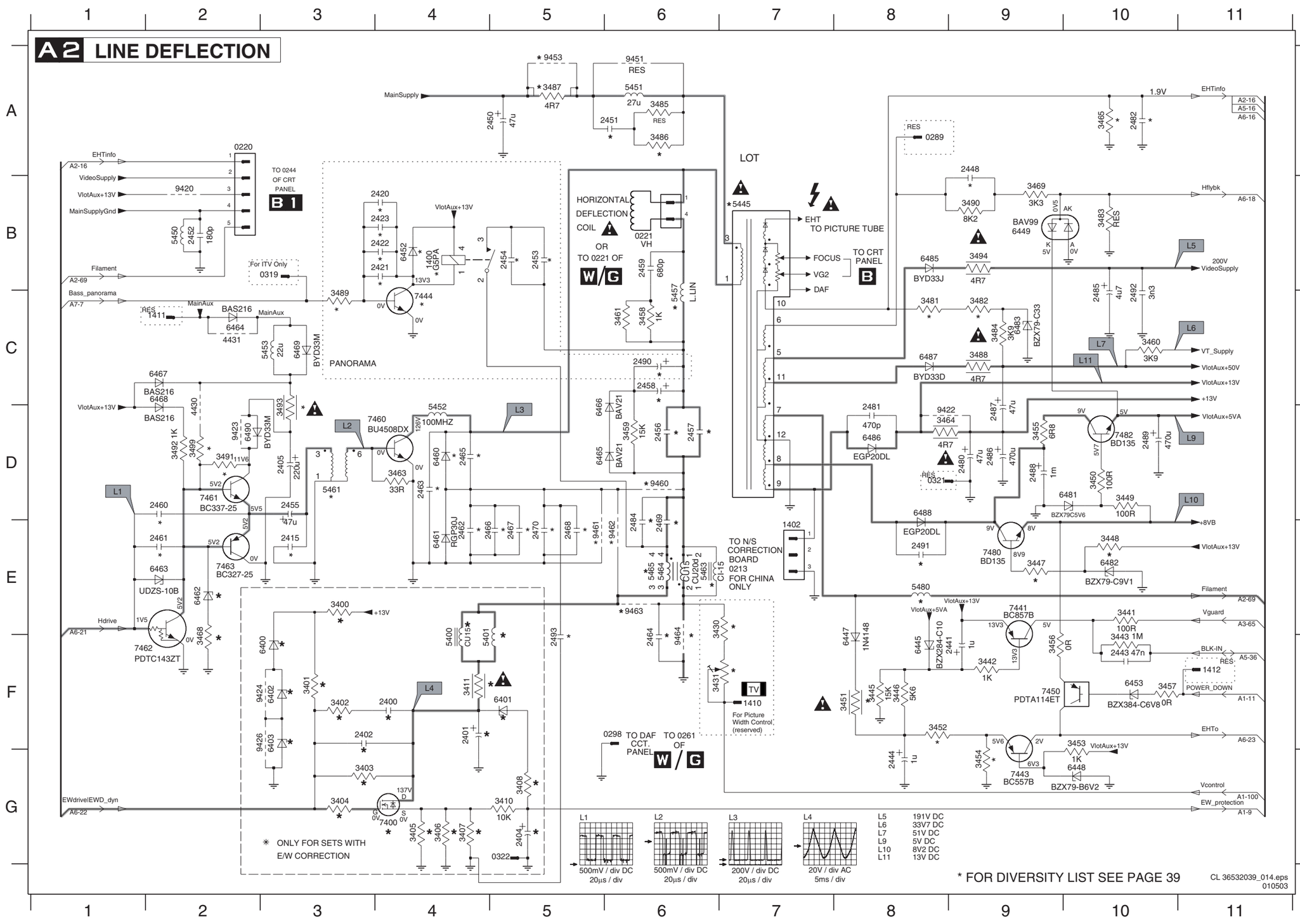
7. Circuit Diagrams and PWB Layouts

Mono Carrier: Power Supply



0211 C1 3591 B9
0212 A1 3594 E9
0213 B5 3595 E10
0231 C1 3596 E10
0251 E11 4500 D10
0282 F11 5500 C4
1500 B2 5501 C3
1515 A8 5502 B5
1540 F10 5520 C7
2500 C3 5521 D7
2501 C6 5560 D8
2502 B6 5561 E10
2503 C6 5562 C8
2504 C7 5564 D9
2505 C7 5565 G2
2506 B5 6500 B6
2507 D7 6520 E2
2508 C7 6522 D2
2509 C4 6523 D5
2515 B7 6524 D7
2516 B7 6525 E7
2520 F2 6526 D6
2521 E1 6540 F9
2522 D6 6541 E8
2523 D6 6560 D9
2525 E5 6561 B9
2526 D2 6562 C9
2527 E7 6563 D9
2528 E2 6564 C11
2540 E9 6565 A11
2541 F8 6566 F10
2560 D9 6567 D9
2561 D9 6568 E9
2562 B9 6569 G9
2563 D9 6570 G7
2564 C9 6580 A9
2566 C9 6582 B9
2567 B10 7515 E7
2568 G8 7520 D2
2569 G10 7521 C6
2580 B9 7522 C5
2581 A9 7540 F9
2590 B10 7541 F8
3500 C1 7542 F8
3501 D1 7560 A10
3503 C5 7561 D10
3504 A3 7562 C9
3506 C4 7564 C10
3507 C4 7580 A8
3508 C3 9500 B2
3509 B5 9501 C2
3510 B4 9502 C2
3511 C5 9503 B5
3519 E6 9504 B5
3520 F2 9505 A3
3521 F2 9506 B4
3522 E5 9507 C4
3523 E5 9508 B3
3524 E6 9509 C3
3525 D6 9510 B9
3526 E6 9511 B10
3527 E7 9530 G2
3528 D2
3529 D4
3530 D6
3531 D5
3532 C6
3541 E8
3542 E9
3543 E10
3544 F10
3545 F9
3548 E9
3550 F10
3552 F8
3557 A9
3558 A9
3560 C9
3561 C8
3562 D9
3563 D10
3564 B10
3565 A9
3566 G8
3567 C9
3568 C10
3569 F8
3570 D10
3580 A9
3590 A9

Mono Carrier: Line Deflection

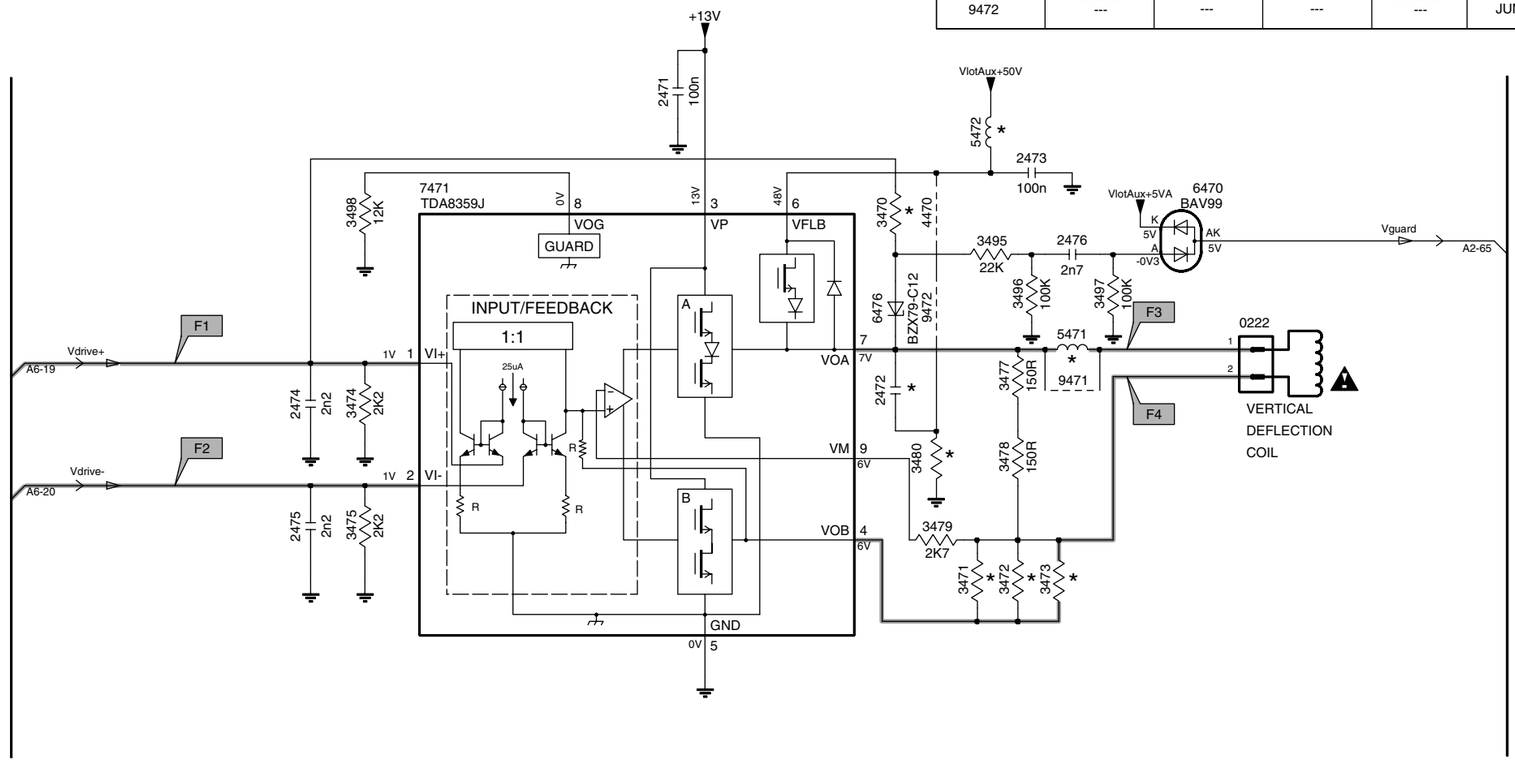


0220 A2
0221 B6
0289 A8
0298 F6
0319 B2
0321 D8
0322 G5
1400 B4
1402 E7
1410 F7
1411 C2
1412 F11
2400 F4
2401 F4
2402 F3
2404 G5
2405 D3
2415 E3
2420 B4
2421 B4
2422 B4
2423 B4
2441 F9
2443 F10
2444 G8
2448 A9
2450 A5
2451 A6
2452 B2
2453 B5
2454 B5
2455 D3
2456 D6
2457 D6
2458 C6
2459 B6
2460 D2
2461 E2
2462 E4
2463 D4
2464 F6
2465 D4
2466 E5
2467 E5
2468 E5
2469 E6
2470 E5
2480 D9
2481 D8
2482 A10
2484 E6
2485 C10
2486 D9
2487 D9
2488 D9
2489 D10
2490 C6
2491 E8
2492 C10
2493 F5
3400 E3
3401 F3
3402 F3
3403 G3
3404 G3
3405 G4
3406 G4
3407 G4
3408 G5
3410 G5
3411 F4
3430 E6
3431 F6
3441 E10
3442 F9
3443 F10
3445 F8
3446 F8
3447 E9
3448 E10
3449 D10
3450 D10
3451 F8
3452 F8
3453 F10
3454 G9
3455 D9
3456 F9
3457 F10
3458 C6
3459 D6
3460 C10
3461 C6
3463 D4
3464 D8
3465 A10
3468 F2
3469 B9
3481 C8
3482 C9
3483 B10
3484 C9
3485 A6
3486 A6
3487 A5
3488 C9
3489 C3
3490 B9
3491 D2
3492 D2
3493 D3
3494 B9
3499 D2
4430 D2
4431 C2
5400 F4
5401 F4
5445 B7
5450 B2
5451 A6
5452 D4
5453 C3
5457 C6
5461 D3
5463 E6
5464 E6
5465 E6
5480 E8
6400 F3
6401 F5
6402 F3
6445 F8
6447 G10
6449 B9
6452 B4
6453 F10
6460 D4
6461 E4
6462 E2
6463 E2
6464 C2
6465 D5
6466 D5
6467 C2
6468 C2
6469 C3
6481 D10
6482 E10
6483 C9
6485 B8
6486 D8
6487 C8
6488 D8
6490 D2
7400 G4
7441 E9
7443 G9
7444 C4
7450 F9
7460 D3
7461 D2
7462 F1
7463 E2
7480 E9
7482 D10
9420 B2
9422 D8
9423 D2
9424 F3
9426 F3
9451 A6
9453 A5
9460 D6
9461 E5
9462 E6
9463 E6
9464 F6

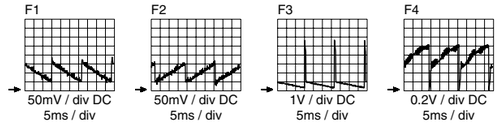
Mono Carrier: Frame Deflection

A3 FRAME DEFLECTION

MODEL	L2K3						
REGION	EU				AP	GL	CH/IN
TUBE	PHCO		LG.PH		LG.PH	SMGK(SF)	LG.PH
SET	28WR	32WR	29RF	24WR	21RF	21RF	29RF
2472	63V 150N	63V 150N	63V 150N	63V 150N	100V 10N	100V 10N	63V 150N
3470	470K	270K	330K	470K	270K	470K	470K
3471	2R2	3R9	3R3	2R2	3R9	3R9	3R9
3472	3R3	3R3	3R3	3R3	4R7	3R9	3R9
3473	3R9	3R9	3R3	3R9	6R8	---	---
3480	1R5	1R5	---	1R5	---	---	1R5
4470	---	---	3U3	---	SMD_JUMPER	SMD_JUMPER	---
5471	6U8	6U8	6MUH8	3U3	6U8	6U8	3U3
5472	3MUH3	3MUH3	---	3MUH3	3MUH3	6MUH8	3MUH3
9472	---	---	---	---	JUMPER	JUMPER	---



REGION	NAFTA			LATAM		AP						
TUBE	SMGK	TOS	LG.PH	LG.PH	LG.PH	SMGK	LG.PH	LG.PH	ORION	LG.PH	LG.PH	MMEC
ITEM	21RF	34RF	32V	32WSRF	28WSRF	34RF	34RF	29RF	29RF	25RF	21RF	21RF
2472	63V 150N	63V 150N	63V 150N	63V 150N	63V 150N	100V 150N	63V 150N	63V 150N	63V 150N	63V 150N	100V 10N	100V 10N
3470	SM0805 390K	SM0805 470K	SM0805 390K	SM0805 270K	SM0805 470K	SM0805 220K	SM0805 220K	SM0805 470K	SM0805 470K	SM0805 470K	270K	270K
3471	4R7	3R3	4R7	3R9	3R3	3R9	3R9	3R9	3R9	3R9	5R6	5R6
3472	2R2	2R2	2R2	3R3	3R3	3R9	3R9	3R9	3R9	3R9	3R3	3R3
3473	3R3	2R2	3R3	3R9	3R9	2R2	2R2	3R3	2R2	3R9	6R8	6R8
3480	1R5	1R5	1R5	1R5	1R5	---	1R5	1R5	1R5	1R5	---	---
4470	---	---	---	---	---	---	---	---	---	---	---	---
5471	3U3	6U8	3U3	6U8	6U8	6U8	3U3	6U8	6U8	6U8	6U8	6U8
9472	---	---	---	---	---	---	---	---	---	---	---	---



CL 36532039_002.eps
010503

0222 C8
2471 B5
2472 C6
2473 B7
2474 D3
2475 D3
2476 C7
3470 C6
3471 D7
3472 D7
3473 D7
3474 D3
3475 D3
3477 C7
3478 D7
3479 D7
3480 D6
3495 C7
3496 C7
3497 C7
3498 C3
4470 C6
5471 C7
5472 B7
6470 B8
6476 C6
7471 B4
9471 C7
9472 C6

Mono Carrier: Tuner IF

A4 TUNER IF

FM-RADIO ANTENNA
0265
2010 1n0
2005 10u
VT_Supply
6001 BZX79-C33
VIotAux+5V
5001 *
I1 0.1V / div DC 200µs / div
I2 0.1V / div DC 200µs / div
I4 1V / div DC 20µs / div

*1000 PS1316
TUNER + FM RADIO (OPTIONAL)
AGC 1
FM-ANT 2
+5V 6
VT 9 34V5
FM 10
IF 11
MT 12 13 14 15
AS 3 SCL 4 SCL 4.3V SDA 5 SDA 4.3V +5V 7 4.9V ADC 8

FOR ITV ONLY 0285
FOR EMC ONLY 0283
TO 0282 OF A1

2004 47n
3003 1K5
2006 470u
2007 100n
6002 RES
6003 RES
3002 JMP
3005 100R
RF_AGC A5-25
2008 100u
3004 8K2
2009 22n

SCL A7-13 3000 100R
SDA A7-14 3001 100R
I2 I1 I3
2001 RES 2002 RES
5002 *
FM A5-24 3010 *
3011 *
2003 10n
4001 *
+8V
3007 * 3008 * 3009 RES
9001
3006 *
4006 RES 6004 BA792
4005 6005 RES

*1002
VIF_1 A5-27
VIF_2 A5-26
*1003 SWI IN ING GND O1 O2
*4003
*4004
4002 *
*1004
SIF_1 A5-28
SIF_2 A5-29
5003 *
4011 RES
4012 *

COMB_BYPASS A7-3
5V 0V *7001
7002 RES
6006 1N4148
6007 1N4148

IF

ITEM	AP-multi	CH-multi	NA/LA/AP-NTSC
1002	K7257 K7260	K2978	F072 M1971
1003		K6274	---
2003	10n	10n	---
3006	2K2	2K2	---
3007	6K8	6K8	---
3008	2K2	2K2	---
4001	---	Jmp	Jmp
4002	---	Jmp	Jmp
4003	Jmp	Jmp	---
4004	Jmp	---	---
6004	1SS356	1SS356	---
7001	PDTC124ET	PDTC124ET	---

Tuner

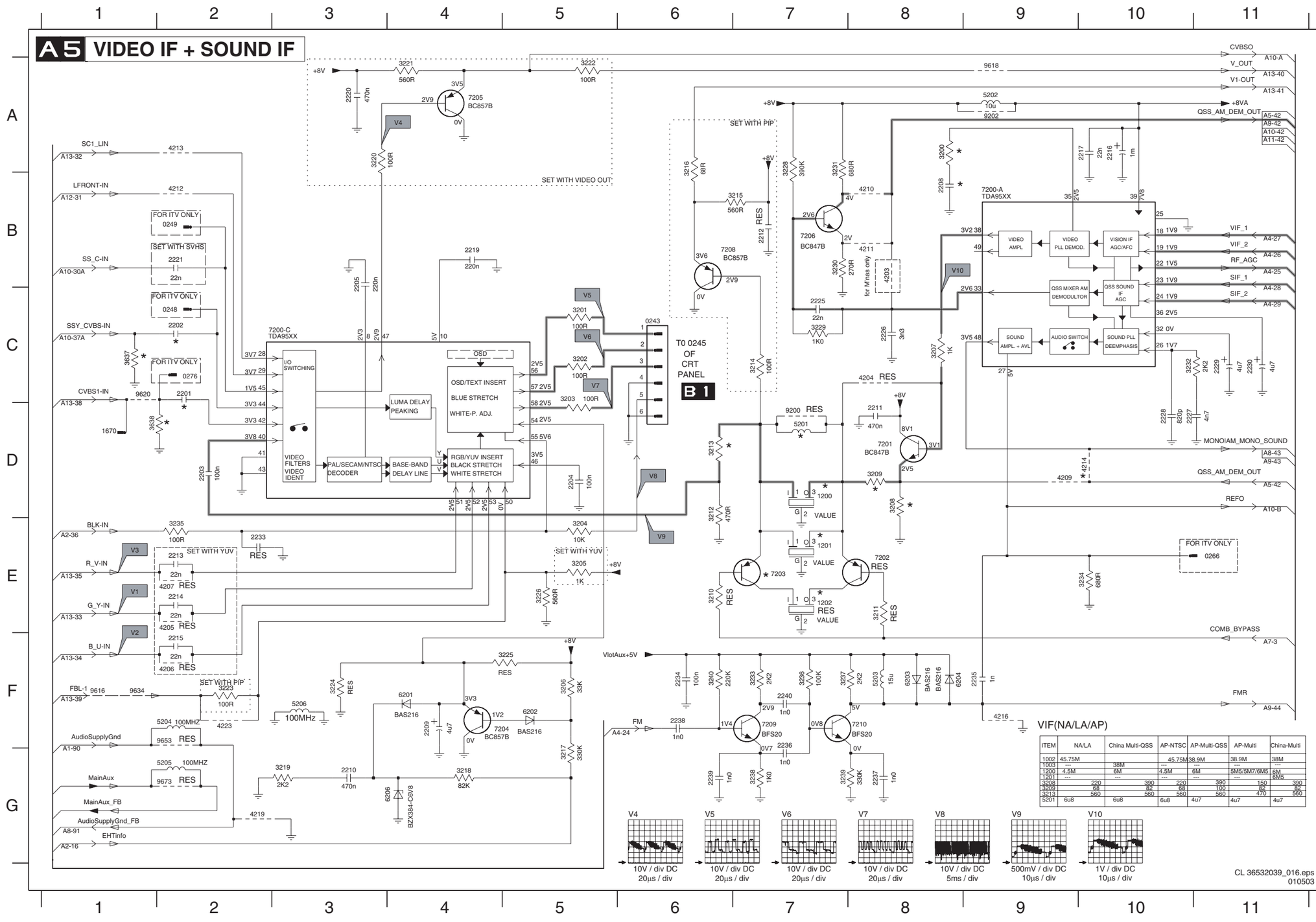
ITEM	LNA (AP)	AP	NA	LA/AP-NTSC
1000	UV1356A	TEDH9-228	ENV56 TEDH9-200A	TEDH9-200A UV1336
5001	47u	47u	27u	5u6
5002	820n	---	820n	820n

CL 36532039_015.eps
010503

0265 A4
0283 C2
0285 B2
1000 B3
1002 D7
1003 E7
1004 F7
2001 D3
2002 D3
2003 D5
2004 B5
2005 A5
2006 B6
2007 B6
2008 C5
2009 C7
2010 A4
3000 C3
3001 C3
3002 C6
3003 B7
3004 C7
3005 C7
3006 E5
3007 D5
3008 D5
3009 D6
3010 D3
3011 D4
4001 D5
4002 F7
4003 E6
4004 E7
4005 E6
4006 E5
4011 F7
4012 G7
5001 B6
5002 C5
5003 F8
6001 A5
6002 C6
6003 C6
6004 E5
6005 E6
6006 F4
6007 F4
7001 F5
7002 F6
9001 D6

Mono Carrier: Video IF + Sound IF

A5 VIDEO IF + SOUND IF

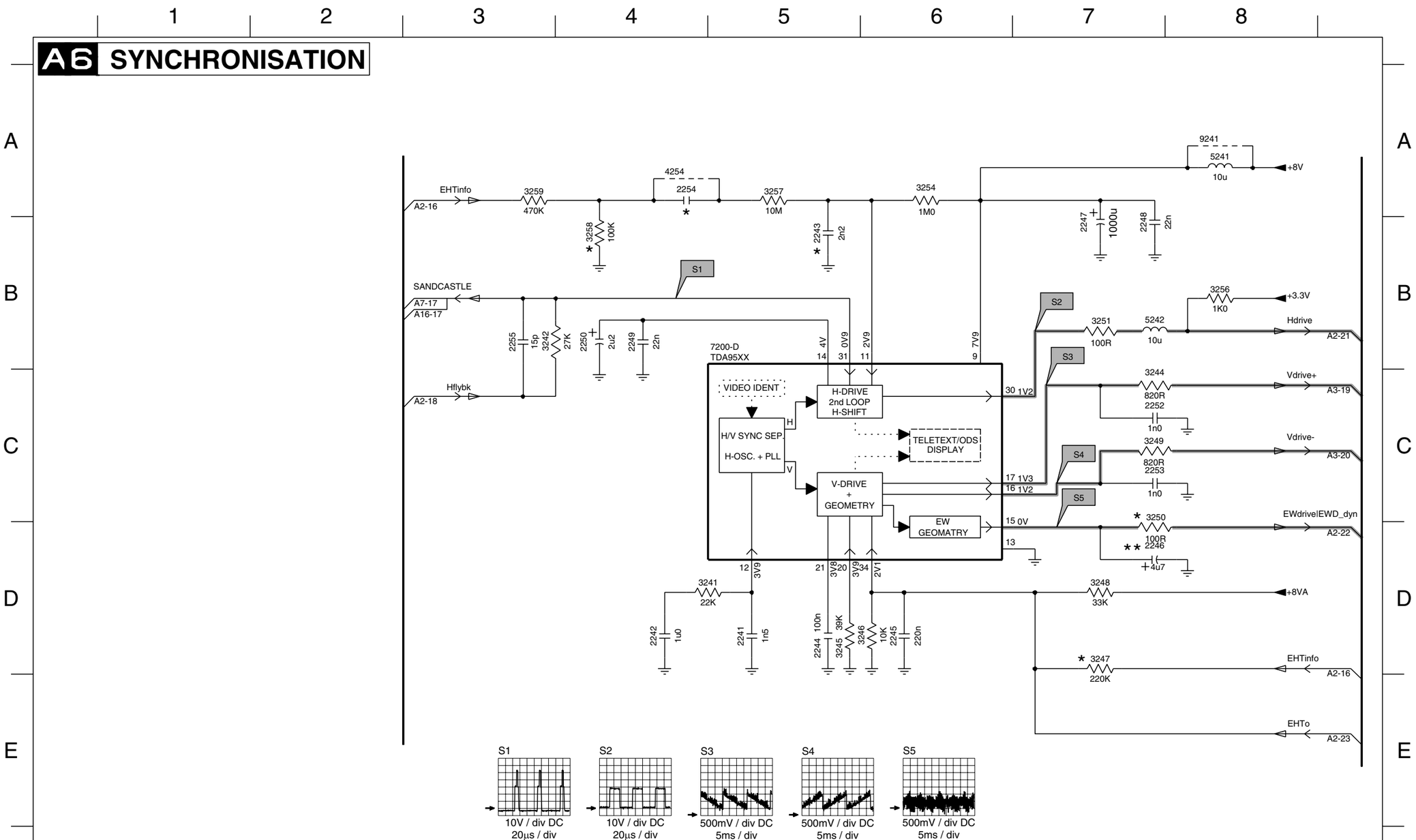


ITEM	NA/LA	China Multi-QSS	AP-NTSC	AP-Multi-QSS	AP-Multi	China-Multi
1002	45.75M		45.75M	38.9M	38.9M	38M
1003	---	38M	---	---	---	---
1200	4.5M	6M	4.5M	6M	5M5/5M7/6M5	6M
1201	---	---	---	---	---	6M5
3208	220	390	220	390	150	390
3209	68	82	68	100	82	82
3213	560	560	560	560	470	560
5201	6u8	6u8	6u8	4u7	4u7	4u7

0243 C6
0248 C2
0249 B2
0266 E11
0276 C2
1200 D7
1201 E7
1202 E7
1670 D1
2201 C2
2202 C2
2203 D2
2204 D5
2205 B3
2208 B8
2209 F4
2210 G3
2211 D8
2212 B7
2213 E2
2214 E2
2215 F2
2216 A10
2217 A10
2219 B4
2220 A3
2221 B2
2225 C7
2226 C8
2227 D10
2228 D10
2229 C11
2230 C11
2233 E2
2234 F6
2235 F9
2236 F7
2237 G8
2238 F6
2239 G6
2240 F7
3200 A8
3201 C5
3202 C5
3203 C5
3204 E5
3205 E5
3206 F5
3207 C8
3208 D8
3209 D8
3210 E6
3211 E8
3212 D6
3213 D6
3214 C7
3215 B7
3216 A6
3217 G5
3218 G4
3219 G3
3220 A3
3221 A4
3222 A5
3223 F2
3224 F3
3225 F5
3226 E5
3228 A7
3229 C7
3230 B7
3231 A7
3232 C10
3233 F7
3234 E10
3235 E2
3236 F7
3237 F7
3238 G7
3239 G7
3240 F6
3637 C1
3638 D1
4203 B8
4204 C8
4205 E2
4206 F2
4207 E2
4209 D9
4210 B8
4211 B8
4212 B2
4213 A2
4214 D10
4216 F9
4219 G2
4223 F2
5201 D7
5202 A9
5203 F8
5204 F2
5205 G2
5206 F3
6201 F4
6202 F5
6203 F8
6204 F8
6206 G4
7200-A B9
7200-C C3
7201 D8
7202 E8
7203 E7
7204 F5
7205 A4
7206 B7
7208 B7
7209 F7
7210 F8
9200 D7
9202 A9
9618 A9
9653 F2
9673 G2

Mono Carrier: Synchronisation

A6 SYNCHRONISATION



REGION	NAFTA			LATAM		AP						
TUBE	SMGK	TOS	LG.PH	LG.PH	LG.PH	SMGK	LG.PH	LG.PH	ORION	LG.PH	LG.PH	MMEC
ITEM	29RF	34RF	32V	32WSRF	28WSRF	34RF	34RF	29RF	29RF	25RF	21RF	21RF
2243	50V 2N2	50V 2N2	50V 2N2	50V 10N	50V 10N	50V 2N2	50V 2N2	50V 2N2	50V 2N2	50V 2N2	50V 2N2	50V 6N8
3247	680K (SMD)	680K (SMD)	680K (SMD)	470K (SMD)	470K (SMD)	SM0603 470K	SM0603 470K	SM0603 680K	SM0603 680K	SM0603 680K	SM0603 270K	SM0603 270K
3250	8K2	8K2	8K2	1K	1K	33R	4K7	8K2	4K7	4K7	---	---
3258	100K (SMD)	100K (SMD)	100K (SMD)	100K (SMD)	100K (SMD)	180K	180K	SM0603 100K	SM0603 220K	SM0603 100K	SM0603 100K	SM0603 100K

CL 36532039_003.eps
010503

2241 D5
2242 D4
2243 B5
2244 D5
2245 D6
2246 D7
2247 B7
2248 B7
2249 B4
2250 B4
2252 C7
2253 C7
2254 A4
2255 B3
3241 D5
3242 B3
3244 B7
3245 D5
3246 D6
3247 D7
3248 D7
3249 C7
3250 C7
3251 B7
3254 A6
3256 B8
3257 A5
3258 B4
3259 A3
4254 A4
5241 A8
5242 B7
7200-D B5
9241 A8

Mono Carrier: Control

A 7 CONTROL

FOR PIP / FOR ITV ONLY
1 POR
2 DATA-OUT
3 DATA-IN
4 CLOCK
5 GND
6 TREBLE-BUZZ
7 Bass_panorama
* 0240
TO 0238 OF P

FOR ITV ONLY 0250
FOR ITV ONLY 0273
FOR ITV ONLY 2616 47n
FOR ITV ONLY 0279
FOR ITV ONLY 0261
FOR ITV ONLY 0318
FOR ITV ONLY 1661
FOR ITV ONLY 0274

VIotAux+5V
ITV_MSG 9647
A13-75
STATUS2 A13-2
COMB_BYPASS A10-D A4-3 A5-3
LED A12-4
Stdby_con A1-5
COMB-SEL-CVBSO-AV2 A10-C
Bass_panorama 9635 9636
A2-7
FOR INDIA ONLY 0317 +3.3V
VolumeIMute A8-15
POWER_DOWN A7-11
SDM 9641 9631
Treble_Buzzer_Hosp-app A8-6
SDA A7-14
SCL A7-13
+8V
SANDCASTLE A6-17
TO 0305 OF A13
FOR CVI
TO 0266 OF P
TO 0217 OF J
TO 0235 OF P
FOR PIP

SET WITH SVHS 3635 100R 9649
3601 8K2
3636 1K0
3640 8K2
3619 RES 3610 8K2
3605 4K7
3609 * 1K
3617 1K
RES
3623 4K7
3618 6K8
3639 1K0
3613 1K0
2604 RES
6601 BAS316
3615 * 10K
3614 * 4K7
4618 *
4604
0217 *
0304

7200-B TDA95XX
3V3 66 3V2 61 3V2 59
C5
C4
3V3 71 SCL
3V3 72 SDA
0V 3
3V2 5
3V3 6
5V 70
0V 78
79
0V 73
0V 74
0V 75
0V 76
0V 77
IIC-BUS TRANSCEIVER
I/O PORTS
VST PWM-DAC
ENHANCED 80C51 CPU
ROM/RAM
TELETEXT ACQUISITION
OSD TELETEXT DISPLAY
1/10 PAGES MEMORY
CVBS
SYNC
R G B BL COR
H V
1 0V
2 0V
67 3V3
68 0V
69 3V2
80 3V3
60 0V
62 0V
63 1V5
64 0V
65 0V
7 4

2602 220n
2615 1n0
2608 1u0
2618 1u0
2611 1u0
2616 47n
5602 5u6
5603 5u6
5604 5u6
+3.3V
3611 100R
7602 EEPROM M24C08
3V3 8
3V3 7
3V3 4
3V3 3
3V3 2
3V3 1
6 3V7
5 3V7
4601 RES
4602 RES
4603 RES
3604 100R
3603 100R
3606 2K2
3607 2K2
+3.9V
3625 100R
3624 100R
2613 68p
2612 68p
SDA
SCL
A4-14 A7-14 A8-14 A9-14 A11-14 A10-H
A4-13 A7-13 A8-13 A9-13 A11-13 A10-I
3629 RES
+3.3V
STATUS1 A13-92
SET WITH YUV
3634 100R
3627 4K7
3626 4K7
POWER_DOWN A1-11 A7-11 A12-10
IR
3622 100R
3608 100R
2619 1u
2602 100p
3628 10K
3633 RES
3630 2K2
3632 0R
KEYBOARD_protn A9-8 A12-8
EW_protection A2-9
3V3
0V3
0V
* 7606 RES
2607 *
2609 *
1660 12MHZ
2606 1n0
C1
C2
C3

For AP/NA/LA

.	55K	Non-55K
2606 3622 3630	1n 470R 2K2	470n JUMPER 470R

For NA/LA/AP

ITEM 7200(UOC)		
AP PAL/NTSC/SECAM	NA NTSC	LA PAL/NTSC
TDA9586 TDA9565 TDA9570 TDA9587	TDA9587 TDA9588 TDA9577	TDA9580 TDA9583 TDA9570 TDA9599

ITEM	SNDAMP-1x1W-MN-GL	SNDAMP-2x1W-ST-EU/AP	SNDAMP-1x3W-NA/LA	SNDAMP-2x10W-ST-AP	SNDAMP-2x3W-ST-NA	SNDAMP-2x5W-ST-EU/AP	SNDAMP-2x5W-ST-IND-MKII	SNDAMP-2x5W-ST-LA	SNDAMP-2x1W-NA	SNDAMP-2x5W-LA
2604	---	---	---	10uF	---	---	---	---	---	---
3618	6K8	10K	6K8	6K8	6K8	6K8	JMP	6K8	6K8	6K8
3623	4K7	4K7	4K7	4K7	4K7	4K7	---	4K7	4K7	4K7

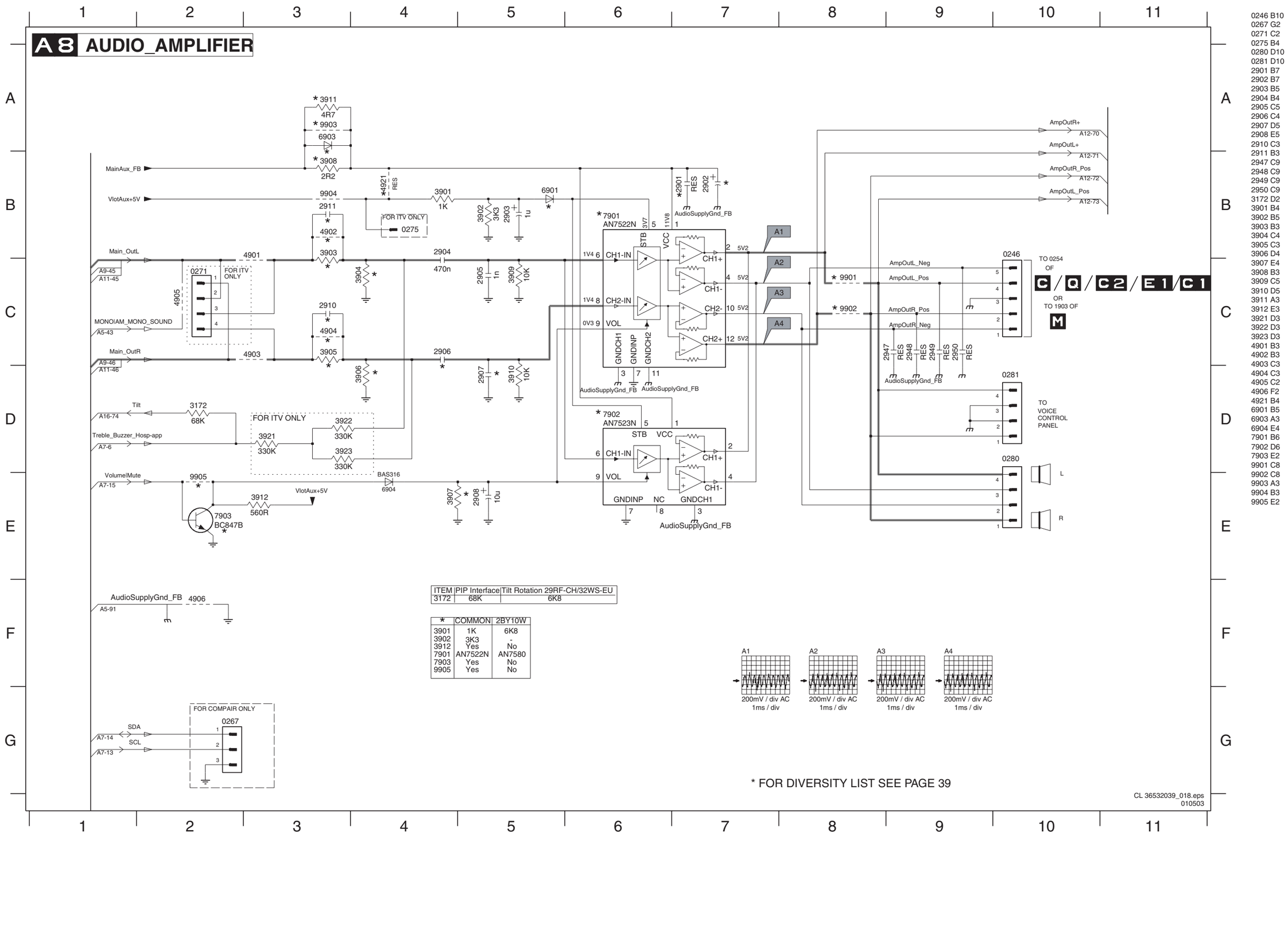
ITEM	SNDAMP-2x3W-LA	SNDAMP-2x1W-NA	SNDAMP-2x3W-ST-NA	SNDAMP-2x5W-ST-AP	SNDAMP-2x3W-ST-NDBX-NA/LA	SNDAMP-2x5W-ST+WOOFER-IND	SNDAMP-1x4W-MN-AP
2604	---	---	---	---	---	---	---
3618	6K8	6K8	6K8	10K	6K8	JMP	6K8
3623	4K7	4K7	4K7	4K7	4K7	---	4K7

C1 500mV / div DC 1ms / div
C2 500mV / div DC 1ms / div
C3 200mV / div DC 1ms / div
C4 10V / div DC 100µs / div
C5 10V / div DC 100µs / div

CL 36532039_017.eps 010503

0217 F2
0240 A3
0250 A2
0261 D2
0273 A4
0274 A8
0279 C3
0304 G2
0316 D3
0317 D1
0318 F1
1660 E7
1661 C7
2601 A6
2602 D8
2604 E2
2606 E8
2607 D7
2608 A5
2609 E7
2611 B5
2612 C8
2613 B8
2615 A6
2616 A4
2618 B5
2619 D8
3601 B3
3603 A8
3604 A8
3605 C2
3606 B7
3607 B7
3608 D9
3609 D3
3610 C3
3611 A7
3613 E2
3614 F2
3615 F2
3617 D2
3618 D2
3619 C3
3622 D7
3623 D3
3624 B7
3625 B7
3626 C7
3627 C9
3628 D7
3629 C9
3630 D8
3632 D8
3633 D8
3634 C7
3635 B2
3636 B2
3639 D3
3640 B3
4601 A7
4602 A7
4603 A7
4604 G2
4618 G2
5602 A5
5603 A5
5604 A5
6601 E2
7200-B C4
7602 A7
7606 E8
9631 E2
9641 E2
9647 B2
9649 B2

Mono Carrier: Audio Amplifier



ITEM	PIP Interface	Tilt Rotation 29RF-CH/32WS-EU
3172	68K	6K8

*	COMMON	2BY10W
3901	1K	6K8
3902	3K3	-
3912	Yes	No
7901	AN7522N	AN7580
7903	Yes	No
9905	Yes	No

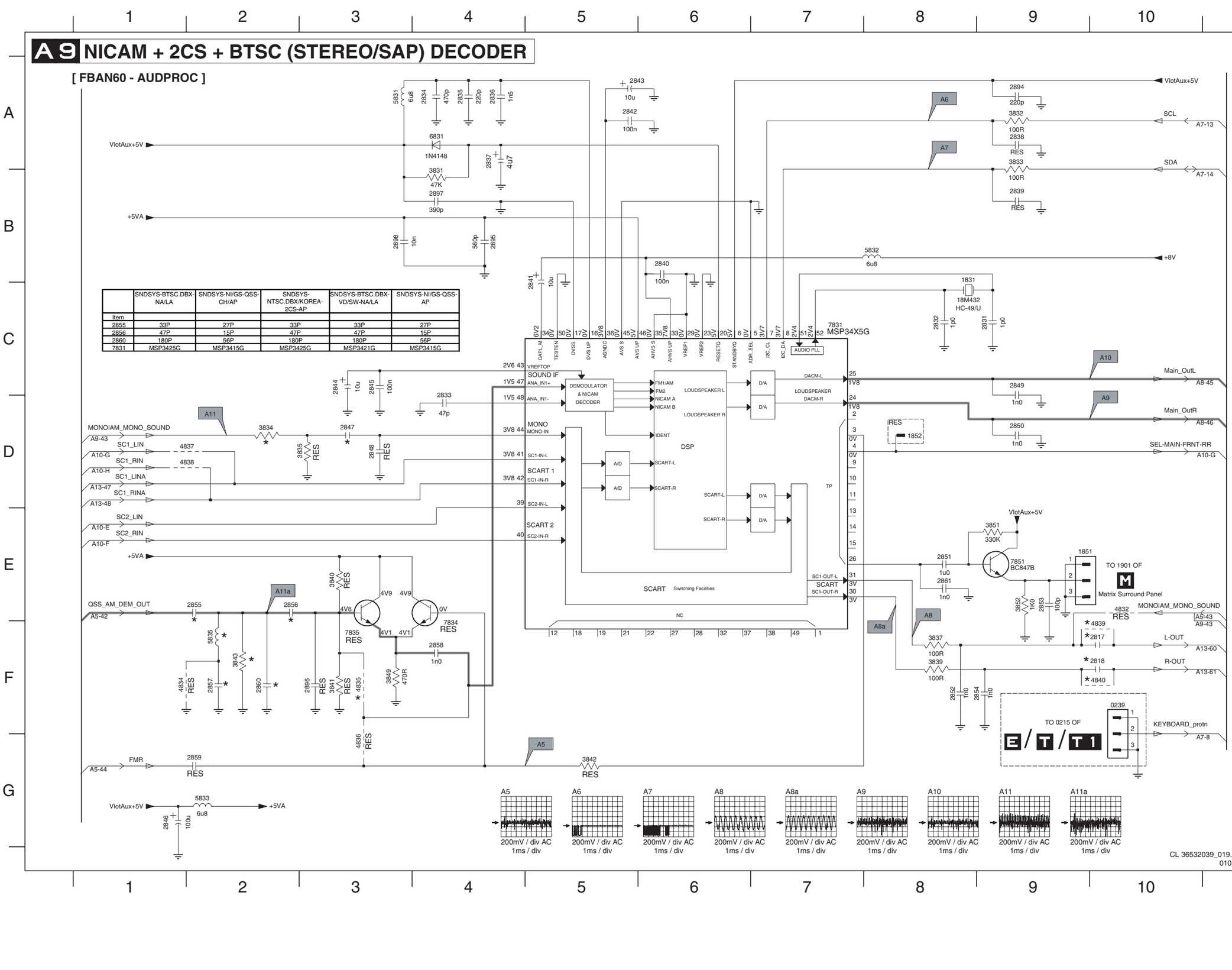
0246 B10
0267 G2
0271 C2
0275 B4
0280 D10
0281 D10
2901 B7
2902 B7
2903 B5
2904 B4
2905 C5
2906 C4
2907 D5
2908 E5
2910 C3
2911 B3
2947 C9
2948 C9
2949 C9
2950 C9
3172 D2
3901 B4
3902 B5
3903 B3
3904 C4
3905 C5
3906 D4
3907 E4
3908 B3
3909 C5
3910 D5
3911 A3
3912 E3
3921 D3
3922 D3
3923 D3
4901 B3
4902 B3
4903 C3
4904 C3
4905 C2
4906 F2
4921 B4
6901 B5
6903 A3
6904 E4
7901 B6
7902 D6
7903 E2
9901 C8
9902 C8
9903 A3
9904 B3
9905 E2

Mono Carrier: NICAM + 2CS + BTSC (Stereo/SAP) Decoder

A9 NICAM + 2CS + BTSC (STEREO/SAP) DECODER

[FBAN60 - AUDPROC]

	SNDSYS-BTSC.DBX-NA/LA	SNDSYS-NI/GS-QSS-CH/AP	SNDSYS-NTSC.DBX/KOREA-2CS-AP	SNDSYS-BTSC.DBX-VD/SW-NA/LA	SNDSYS-NI/GS-QSS-AP
Item					
2855	33P	27P	33P	33P	27P
2856	47P	15P	47P	47P	15P
2860	180P	56P	180P	180P	56P
7831	MSP3425G	MSP3415G	MSP3425G	MSP3421G	MSP3415G



0239 F10
1831 B8
1851 E9
1852 D8
2817 F10
2818 F10
2831 C9
2832 C8
2833 D4
2834 A4
2835 A4
2836 A4
2837 A4
2838 A9
2839 B9
2840 B6
2841 B5
2842 A5
2843 A5
2844 C3
2845 C3
2846 G1
2847 D3
2848 D3
2849 C9
2850 D9
2851 E8
2852 F8
2853 E9
2854 F9
2855 E2
2856 E2
2857 F2
2858 F4
2859 G2
2860 F2
2861 E8
2894 A9
2895 B4
2896 F3
2897 B4
2898 B3
3831 B4
3832 A9
3833 A9
3834 D2
3835 D3
3837 F8
3839 F8
3840 E3
3841 F3
3842 G5
3843 F2
3849 F3
3851 E9
3852 E9
4832 E10
4834 F1
4835 F3
4836 G3
4837 D2
4838 D2
4839 F10
4840 F10
5831 A3
5832 B8
5833 G2
5835 F2
6831 A4
7831 C7
7834 F4
7835 F3
7851 E9

Mono Carrier: Audio/Video Source Switching

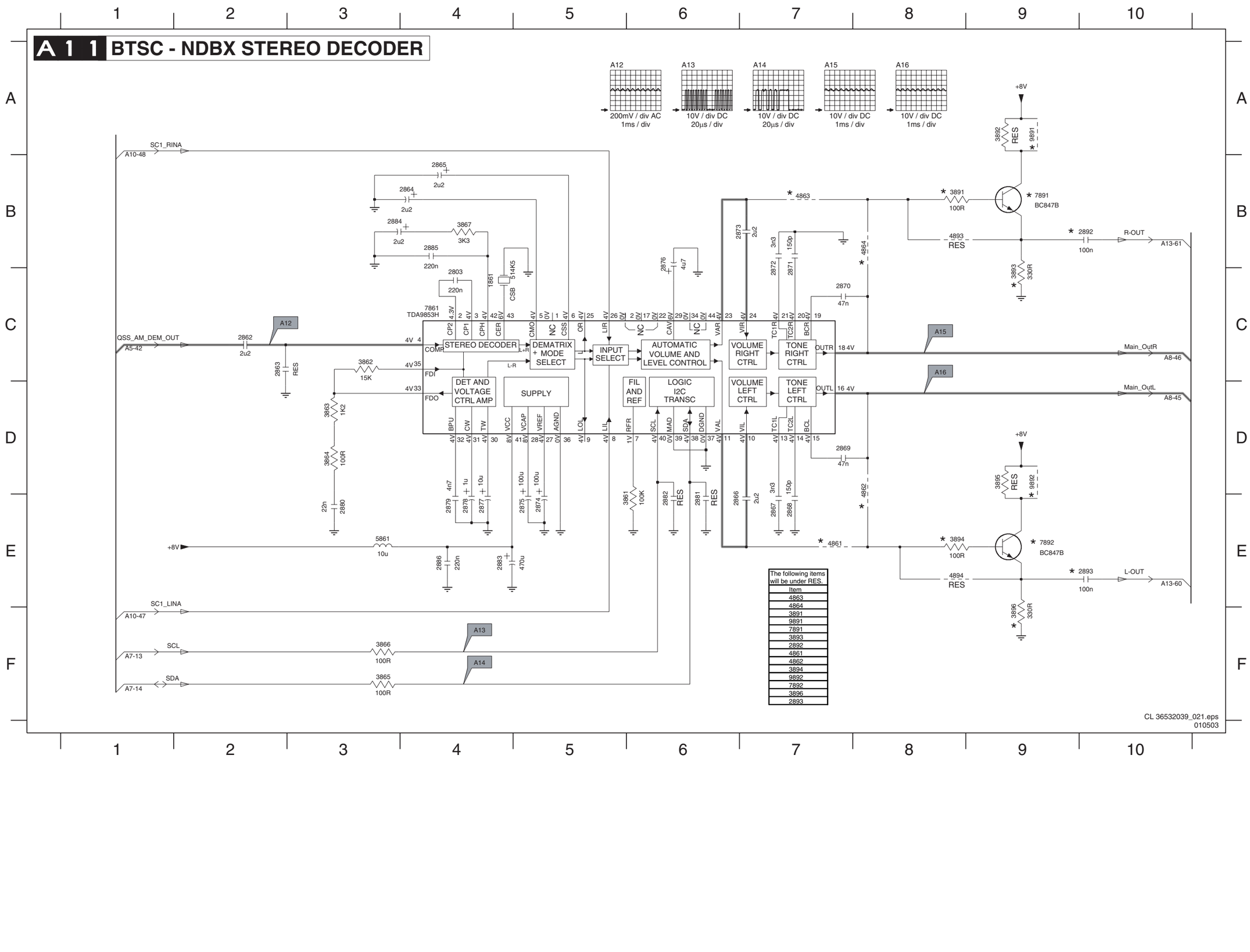
A 1 Ø AUDIO/VIDEO SOURCE SWITCHING

	2 x Rear AV in & 1 x AV out with SVHS & YUV, 1 x side AV in	2 x Rear AV in & 1 x AV out with SVHS & YUV	2 x Rear AV in with SVHS	2 x Rear AV in & 1 x AV out with SVHS	1 x Rear AV in	1 x Rear AV in & 1 x AV out with SVHS & YUV, 1 x front AV in	1 x Rear AV in & 1 x AV out with SVHS & YUV, 1 x Side AV in	1 x Rear AV in & 1 x AV out
Item								
2802	Yes	Yes	-	Yes	-	Yes	Yes	-
3810	Yes	-	-	-	-	Yes	Yes	-
4807	-	Yes	Yes	Yes	-	-	-	-
4808	-	-	-	-	Yes	-	-	-
4812	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-
4814	Yes	Yes	Yes	Yes	-	Yes	Yes	-
4816	-	Yes	Yes	Yes	-	-	-	-
4817	-	-	-	-	Yes	-	-	Yes
4818	-	Yes	Yes	Yes	-	-	-	-
4819	-	-	-	-	Yes	-	-	-
7802	Yes	Yes	-	Yes	-	Yes	Yes	-

1810A E2
1810B C3
1811 F4
2802 B9
2807 B5
2810 C9
2813 D9
2814 E7
2815 E7
2816 B3
3801 B2
3802 B2
3809 F7
3810 F7
3811 C2
3812 C2
3813 C3
3814 B7
3815 C7
3816 B7
3817 C7
3818 D7
3819 E7
3820 C7
3821 E7
3822 F7
4807 F7
4808 F8
4812 D3
4814 E3
4816 C8
4817 C8
4818 E7
4819 E8
4820 E10
4821 D2
4823 D2
4824 E2
4825 C10
4826 C10
4827 C10
4829 D7
4830 E7
4831 F7
4841 C7
4886 E5
4892 D5
5810 D3
7802-A C8
7802-B E8
7802-C D8
7803-A C4
7803-B D4
7803-C E4
7804 C3
9810 C7

Mono Carrier: BTSC NDBX Stereo Decoder

A 1 1 BTSC - NDBX STEREO DECODER



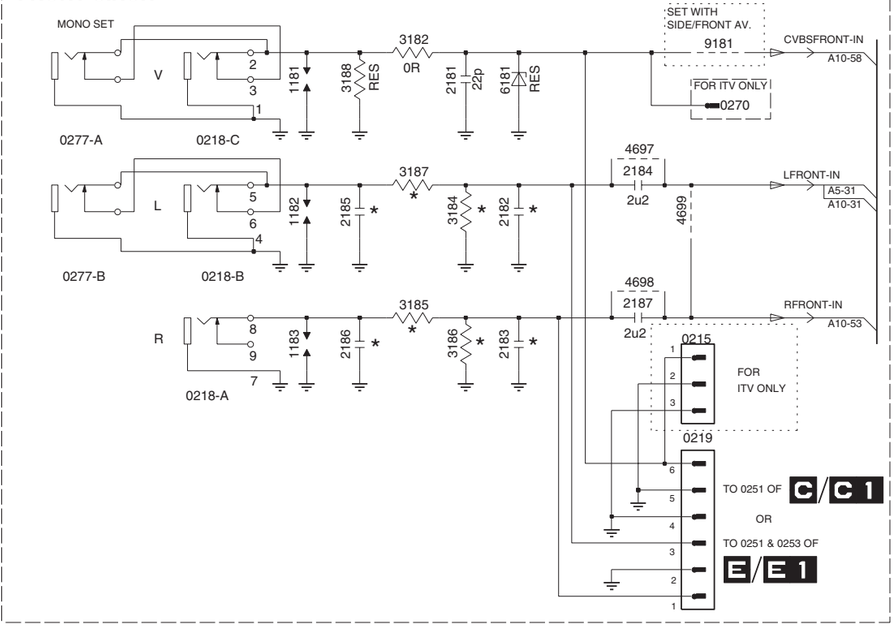
CL 36532039_021.eps
010503

1861 C4
2803 C4
2862 C2
2863 C2
2864 B4
2865 B4
2866 E6
2867 E7
2868 E7
2869 D7
2870 C7
2871 C7
2872 C7
2873 B7
2874 E5
2875 E5
2876 B6
2877 E4
2878 E4
2879 E4
2880 E3
2881 E6
2882 E6
2883 E4
2884 B3
2885 B4
2886 E4
2892 B10
2893 E10
3861 E6
3862 C3
3863 D3
3864 D3
3865 F3
3866 F3
3867 B4
3891 B8
3892 A9
3893 C9
3894 E8
3895 D9
3896 F9
4861 E7
4862 D8
4863 B7
4864 B8
4893 B8
4894 E8
5861 E3
7861 C4
7891 B9
7892 E9
9891 A9
9892 D9

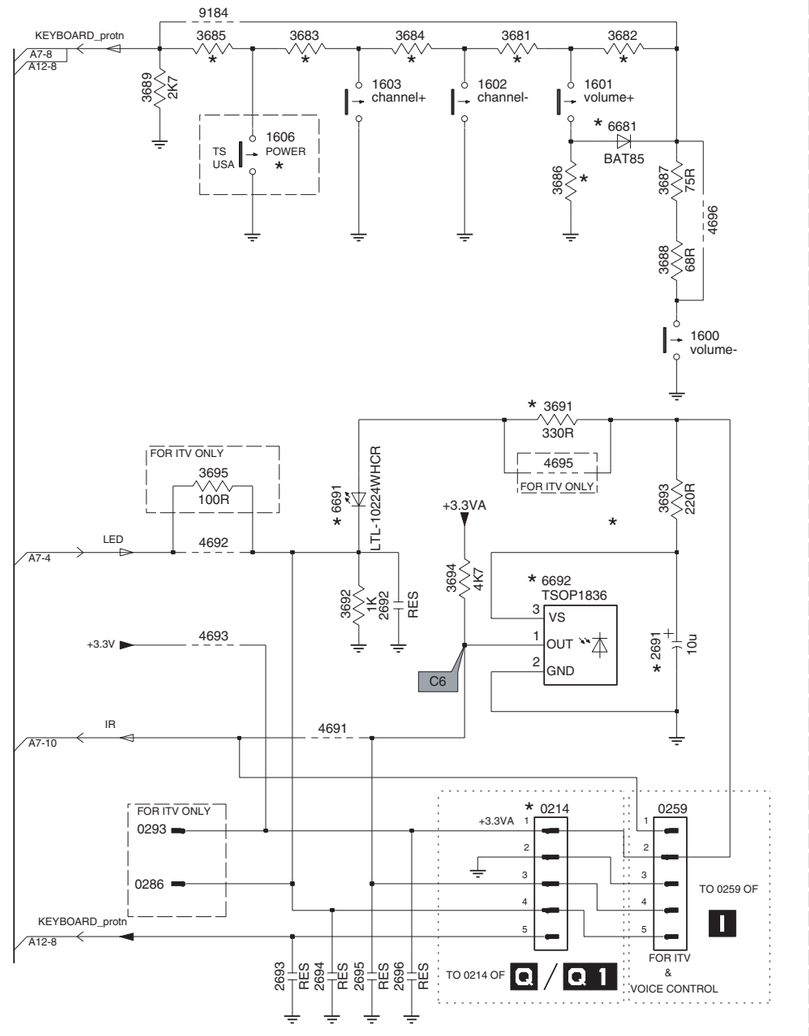
Mono Carrier: Front I/O + Front Control + Headphone

A12 FRONT IO + FRONT CONTROL + HEADPHONE

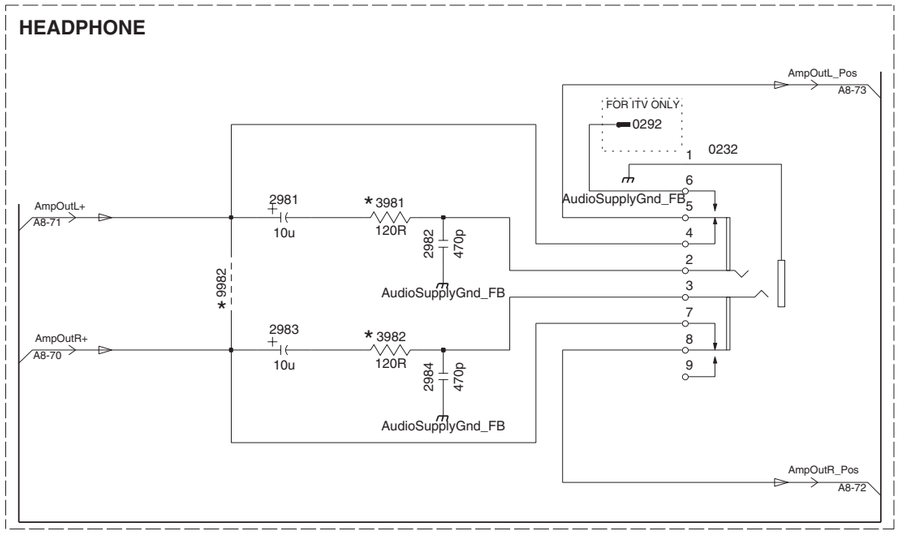
FRONT CINCH



FRONT CONTROL



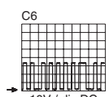
HEADPHONE



For Engg Purpose Only

4694

C6



10V / div DC
2ms / div

* FOR DIVERSITY LIST SEE PAGE 39

CL 36532039_022.eps
010503

0214 E9
0215 C4
0218-A C2
0218-B B2
0218-C B2
0219 C4
0232 E5
0259 E10
0270 A5
0277-A B1
0277-B B1
0286 F7
0292 E4
0293 E7
1181 A2
1182 B2
1183 C2
1600 C10
1601 A9
1602 A9
1603 A8
1606 B8
2181 A3
2182 B3
2183 C3
2184 B4
2185 B3
2186 C3
2187 B4
2691 D10
2692 D8
2693 F8
2694 F8
2695 F8
2696 F8
2981 E2
2982 F3
2983 F2
2984 F3
3182 A3
3184 B3
3185 B3
3186 C3
3187 B3
3188 A3
3681 A9
3682 A10
3683 A8
3684 A8
3685 A7
3686 B9
3687 B10
3688 B10
3689 A7
3691 C9
3692 D8
3693 D10
3694 D9
3695 C7
3981 E3
3982 F3
4691 E8
4692 D7
4693 D7
4694 G5
4695 C9
4696 B10
4697 B4
4698 B4
4699 B4
6181 A3
6681 B10
6691 D8
6692 D9
9181 A5
9184 A7
9982 F2

Mono Carrier: Rear I/O Cinch

A13 REAR I/O CINCH

SET WITH VIDEO OUT
+8V
2101 470n
7V9
3V6
7101 BC847B
3V
V_OUT A5-40
FOR ITV - TO 0227 OF J
0227

MONITOR OUTPUT
0223-D
V 16
L 14
R 15
13
3101 68R
1101
2102 22p
3102 1K
3103 150R
3105 150R
2105 10u
2106 10u
1102
1103
2107 RES
2108 RES
2103 330p
2104 330p
3104 220K
3106 220K
SET W/O YUV
4101
4104
4102
FOR ITV ONLY 1130
FOR ITV ONLY 0310

L-OUT A9-60 (U&L) A11-60 (U&L)
R-OUT A9-61 (U&L) A11-61 (U&L)
L2-IN A10-52
R2-IN A10-55
2132 2u2
2134 2u2
3132 47K
3134 47K
2131 330p
2133 330p
3131 150R
3133 150R
2137 RES
2138 RES
1111
1112

AV2
0223-A
V 4
L 2
R 3
1
1110
0269
(FOR SETS WITH 9+3P CINCH)

YUV INPUT
0223-C
Y 12
U 10
V 11
9
9103 NOT FOR PIP SET
FOR ITV ONLY 0311
9102
FOR ITV ONLY 0312
9101
3112 100R
3114 100R
3116 100R
9111 RES
9112 RES
9113 RES
1104
1105
1106
3111 75R
3113 75R
3115 75R
2111 22p
2112 22p
2113 22p
3151 RES
3152 RES
3153 RES
G_Y-IN A5-33
B_U-IN A5-34
R_V-IN A5-35
FBL-1 A5-39
STATUS1 A7-92
STATUS2 A7-2
SET WITH YUV

SET WITH SVHS
3136 100R
2135 22p
3135 75R
9104
3138 *
2136 *
3137 *
C-IN A10-30
Y_CVBS-IN A10-59
4131 SET WITH AV2 W/O SVHS
SVHS
0225-B
0225-A
1113
1114
1115
9121
9122
4121
3141 1K
4132
2141 330p
SET WITH SVHS
4122
4123
4124
4125
4126

SET WITH YUV
VIotAux+5V
3156 10K
2142 RES
3154 5K6
7103 BC847B
3159 1K2
3157 1K5
2143 100n
3158 10K
7102 BC857B
6150 BAS316
3149 100K
3150 150K
2150 150n

0226
FOR PIP
FOR 0290 OF P
FOR CVI
TO 0304 OF A7
0305
0242
FOR ITV - TO 0242 OF J
FOR PIP - TO 0219 OF P
CONNECT TO 0311 0313
CONNECT TO 0312 0314
CONNECT TO 0310 0315
FOR YUV AT AV1 LOCATION
V1-OUT A5-41
0229
TO 0242 OF TO 0229 OF TO 0216 OF
FOR PIP P P P
TO 0242 OF
FOR ITV J

AV1
0223-B
V 8
L 6
R 7
5
9123 3122 *
9124 3123 150R
9125 3125 150R
1107
1108
1109
3121 *
2127 RES
2128 RES
2121 *
2122 330p
2124 330p
3124 47K
3126 47K
2123 2u2
2125 2u2
CVBS1-IN A5-38
SC1_LIN A5-32 A9-47
SC1_RIN A9-48

MainSupplyGnd
0262
FOR ITV ONLY
TO 0262 OF I
ITV_MSG A7-75

ITEM	21PT5431	21PT4223 25PT4324/3523 29PT3323	25PT5531 29PT4631	20PT633R 21PT633R	32ST220 32ST230 36ST220	25LT220 25LT421 27LT220 27LT621 27ST420 27ST421 32LT621	25ST220 27ST110 27ST220 27ST230 27ST240	21PT1323 21PT1324 21PT1325 Mono Sets
2121	22p	22p	---	---	---	---	---	22p
2136	---	---	---	22p	22p	22p	22p	---
3121	---	---	---	---	75R	75R	75R	---
3122	---	---	---	---	680R	---	680R	---
9104/3138	---	JMP	JMP	---	JMP	JMP	JMP	---
9123/3137	JMP	JMP	JMP	---	JMP	JMP	---	JMP

CL 36532039_004.eps
240403

0223-A A10
0223-B F2
0223-C C2
0223-D A2
0225-A D10
0225-B D9
0226 D2
0227 A6
0229 E6
0242 D4
0262 G5
0305 E3
0310 B4
0311 C4
0312 D4
0313 E5
0314 E5
0315 E5
1101 A3
1102 B3
1103 B3
1104 C3
1105 C3
1106 D3
1107 F3
1108 F3
1109 G3
1110 A9
1111 B9
1112 B9
1113 C8
1114 D8
1115 D9
1130 C4
2101 A5
2102 A4
2103 B4
2104 B4
2105 B5
2106 B5
2107 B3
2108 B3
2111 C5
2112 C5
2113 D5
2121 F4
2122 F4
2123 F4
2124 G4
2125 G4
2127 F3
2128 G3
2131 B8
2132 B7
2133 B8
2134 B7
2135 C7
2136 D7
2137 B8
2138 B8
2141 E7
2142 D1
2143 E2
2150 F1
3101 A4
3102 A4
3103 B4
3104 B4
3105 B4
3106 B4
3111 C3
3112 C4
3113 D3
3114 C4
3115 D3
3116 D4
3121 F3
3122 F3
3123 F3
3124 F4
3125 G3
3126 G4
3131 B8
3132 B7
3133 B8
3134 B7
3135 C8
3136 C7
3137 D8
3138 D7
3141 D7
3149 F1
3150 F1
3151 C5
3152 C5
3153 D5
3154 D1
3156 D1
3157 E1
3158 D2
3159 E1
4101 B3
4102 B3
4104 B3
4121 D7
4122 E6
4123 E6
4124 E7
4125 E8
4126 E8
4131 C9
4132 E7
6150 F1
7101 A5
7102 D2
7103 E1
9101 D4
9102 C4
9103 C4
9104 D7
9111 C4
9112 C4
9113 D4
9121 D6
9122 D6
9123 F3
9124 F3
9125 F3

Mono Carrier: Diversity Tables

DIVERSITY TABLE FOR A1 POWER SUPPLY

REGION	NA			LA/AP				CH	
AUDIO OUTPUT	2X3W	2X10W		2X5W		2X10W		2X5W	2X10W
SET		130V	143V	143V	130V	130V	143V		
2503	200V 470U	200V 470U	200V 470U	400V 330U	400V 330U	400V 330U	400V 330U	450V 220U	450V 220U
2505	1KV 2N2	1KV 2N2	1KV 2N2	1KV 2N2	1KV 2N2	1KV 3N3	1KV 2N2	1KV 2N2	1KV 2N2
2516	-	-	-	-	-	-	250V 470	-	-
2520	16V 100N	16V 100N	16V 100N	16V 100N	16V 100N	50V10N	16V 100N	16V 100N	50V 10N
3504	144V 3R	144V 3R	144V 3R	265V 9R	265V 9R	265V 9R	265V 9R	265 V9R	265V 9R
3521	1/6W 4R7	1/6W 4R7	1/6W 4R7	1/6W 22R	1/6W 22R	1/6W 22R	1/6W 22R	1/6W 22R	1/6W 4R7
3522	330K	330K	330K	390K	390K	330K	330K	390K	330K
3523	100R	100R	100R	47R	47R	47R	47R	47R	47R
3526	0.1R	0.1R	0.1R	0.15R	0.15R	0.15R	0.15R	0.15R	0.22R
3627	0.33	0.15R	0.15R	0.12R	0.12R	0.22R	0.22R	0.22R	0.22R
3545	270K	33K	33K	270K	270K	270K	33K	270K	270K
3552	10K	4K7	4K7	10K	10K	4K7	10K	10K	4K7
3557	1K	1K	1K	1K	1K	1K5	1K	1K	1K5
3561	100R	100R	100R	220R	220R	220R	220R	220R	180R
3562	12K	12K	12K	12K	12K	15K	12K	12K	15K
3563	5K6	8K2	8K2	8K2	8K2	8K2	8K2	8K2	4K7
3565	330R	220R	220R	330R	330R	220R	220R	330R	220R
5500	-	-	-	FL 10MH	FL 10MH	FL 10MH	FL 10MH	FL MAINS 22MH	FL MAINS 22MH
5501	FL 5MH	FL 5MH	FL 5MH	FL 5MH	FL 5MH	FL 5MH	FL 5MH	FL 5MH	FL 5MH
5520	SS 39009-04	SS42202	SS42204	SS42026	SS42025	SS49109	SS49205	SS42025	PSS42-110
6500	GBU6JL	GBU4JL	GBU4JL	GBU6JL	GBU6JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL
6524	DIO	DIO	DIO	DIO	DIO	DIO	DIO	JUMPER	DIO
6525	DIO	DIO	DIO	DIO	DIO	DIO	DIO	DIO	DIO
6541	C10V	C9V1	C9V1	C9V1	C9V1	C9V1	C9V1	C9V1	C9V1
6570	C6V8	C6V8	C6V8	C6V2	C6V2	C8V2	C6V2	C6V2	C8V2
7521	STP8NC50	STP8NC50	STP8NC50	STU9NC80	STU9NC80	STP7NC80	STU9NC80	STP7NC80	STP7NC80

DIVERSITY TABLE FOR A8 AUDIO AMPIFIER

ITEM	SNDAMP-2x3w-NA	SNDAMP-2x5w-LA	SNDAMP-2x10w-ST-AP	SNDAMP-2x10w ST-NA/LA	SNDAMP-2x10w-NTSC-AP	SNDAMP-2x5w-ST-AP	SNDAMP-2x3w-ST-NDBX-LA/NA	SNDAMP-2x5w-ST-NDBX-LA/NA	SNDAMP-P-1x4w-MN-AP	SNDAMP-1x3w-MN-CH
2902	1000uF/16v	1000uF/16v	1000uF/25v	1000uF/25v	1000uF/25v	1000uF/16v	1000uF/16v	1000uF/16v	1000uF/16v	1000uF/16v
2904	470nF	470nF	470nF	470nF	470nF	470nF	27nF	27nF	470nF	470nF
2905	1nF	1nF	1nF	1nF	1nF	1nF	1n2	1n2	1nF	1nF
2906	470nF	470nF	470nF	470nF	470nF	470nF	27nF	27nF	470nF	---
2907	1n	1nF	1nF	1nF	1nF	1nF	1n2	1n2	1n	---
2910	3n3	3n3	---	---	---	3n3	10n	10n	---	---
2911	3n3	3n3	---	---	---	3n3	10n	10n	---	---
2950	330P	330P	---	---	---	330P	330P	330P	330P	330P
3901	1k	1k	6k8	6k8	6k8	1k	1k	1k	1k	1k
3902	3k3	3k3	---	---	---	3k3	3k3	3k3	3k3	3k3
3903	3k3	3k3	47k	47k	47k	3k3	3k3	3k3	3k3	3k3
3904	10k	10k				10k	10k	10k	10k	10k
3905	3k3	3k3	47k	47k	47k	3k3	3k3	3k3	---	---
3906	10k	10k	---	---	---	10k	10k	10k	---	---
3907	8k2	8k2	---	---	---	6k8	8k2	8k2	8k2	8k2
3909	---	---	27k	27k	27k	---	---	---	---	---
3910	---	---	27k	27k	27k	---	---	---	---	---
3912	---	---	820	820	820	---	---	---	---	---
6901	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP
6903	---	---	---	---	---	---	---	---	---	---
7901	AN7522N	AN7522N	AN7580	AN7580	AN7580	AN7522N	AN7522N	AN7522N	AN7522N	AN7522N
7902	---	---	---	---	---	---	---	---	---	---
7903	---	---	BC847B	BC847B	BC847B	---	---	---	---	---
9903	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP
9923	---	---	JMP	JMP	JMP	---	---	---	---	---

DIVERSITY TABLE FOR A2 LINE DEFLECTION

REGION	AP						
TUBE	LG.PH	SAMSUNG	LG.PH	ORION	LG.PH	LG.PH(HF)	MMEC
EW/NON EW	EW	EW	EW	EW	EW	NO EW	NO EW
ITEM	34RF	34RF	29RF	29RF	25RF	21RF	21RF
2209	50V 4U7	50V 4U7	50V 4U7	50V 10U	50V 4U7	50V 4U7	50V 4U7
2216	16V 2200U	16V 2200U	10V 1000U	10V 1000U	16V 1000U	16V 1000U	16V 1000U
2243	50V 2N2	50V 2N2	50V 2N2	50V 2N2	50V 2N2	50V 2N2	50V 6N8
2245	16V 220N	16V 220N	16V 220N	16V 220N	16V 220N	16V 220N	16V 330N
2247	16V 2200U	16V 2200U	10V 1000U	10V 1000U	16V 1000U	10V 1000U	10V 1000U
2401	50V 2U2	50V 2U2	100V 2U2	100V 2U2	50V 2U2	---	---
2402	500V 470P	500V 470P	500V 470P	500V 470P	500V 470P	---	---
2404	50V 47U	50V 47U	50V 47U	50V 47U	50V 47U	---	---
2405	25V 220U	25V 220U	25V 220U	25V 220U	25V 220U	25V 220U	25V 220U
2420	---	---	---	---	---	---	---
2421	---	---	---	---	---	---	---
2451	50V 22N	---	---	---	---	---	---
2454	---	---	---	---	---	---	---
2457	250V 270N	250V 390N	250V 330N	250V 360N	250V 390N	250V 270N	250V 330N
2458	100V 2U2	100V 2U2	100V 2U2	100V 2U2	100V 2U2	100V 2U2	100V 2U2
2463	2KV 820P	2KV 820P	2KV 2N2	2KV 1N8	2KV 1N5	2KV 680P	2KV 470P
2464	160V 2U2	160V 2U2	160V 2U2	160V 2U2	160V 2U2	160V 2U2	---
2465	1K6V 12N	1K6V 15N	1K6V 15N	1K6V 15N	1K6V 15N	1K6V 9N1	1K6V 8N2
2466	---	400V 15N	---	---	400V 15N	---	---
2467	---	---	400V 22N	400V 22N	---	400V 68N	400V 68N
2468	400V 18N	400V 18N	400V 15N	400V 15N	400V 18N	400V 15N	400V 22N
2469	---	---	---	---	---	---	---
2482	250V 168N	250V 120N	250V 120N	250V 120N	250V 68N	250V 68N	250V 33N
2490	---	---	---	---	---	---	---
3176	---	---	---	---	---	---	---
3206	33K	33K	33K	33K	33K	33K	100K
3247	680K	680K	680K	680K	680K	270K	270K
3250	4K7	4K7	---	---	4K7	---	---
3257	10M	10M	10M	10M	10M	10M	10M
3258	180K	100K	220K	220K	100K	100K	330K
3259	470K	470K	470K	470K	470K	470K	470K
3400	330R	330R	330R	330R	330R	---	470K
3401	33K	33K	33K	68K	68K	---	---
3403	82K	100K	100K	100K	82K	---	---
3405	4R7	4R7	4R7	4R7	4R7	---	---
3406	4R7	4R7	4R7	4R7	4R7	---	---
3407	---	---	---	---	---	---	---
3408	100R	100R	100R	100R	100R	---	---
3447	180R	180R	56R	56R	56R	180R	56R
3448	820R	820R	820R	820R	820R	820R	820R
3465	27K	27K	27K	27K	27K	27K	27K
3451	3R9	10R	10R	10R	10R	10R	10R
3452	47K	47K	47K	47K	47K	47K	47K
3454	15K	15K	15K	15K	15K	15K	15K
3468	---	---	---	---	---	---	---
3481	12K	10K	15K	15K	10K	18K	18K
3482	10K	10K	6K8	8K2	15K	12K	12K
3484	3K9	3K9	3K9	3K9	3K9	3K9	3K9
3486	22R	---	---	22R	---	3W 22R	---
3489	---	---	---	3K9	---	---	---
3491	10K	10K	10K	10K	10K	10K	10K
3492	---	---	1K	1K	470R	1K	470R
3493	---	10R	6R8	6R8	6R8	6R8	10R
3499	---	470R	---	---	---	---	---
3617	---	---	---	---	---	---	---
3619	---	---	---	---	---	---	---
3640	---	---	---	---	---	---	---
4401	0R05	0R05	0R05	0R05	0R05	0R05	---
4402	0R05	0R05	---	---	0R05	---	---
4430	0R05	0R05	---	---	---	---	---
5400	---	---	COI CHOKE	COI CHOKE	---	---	---
5401	1000U	1000U	1000U	1000U	1000U	---	---
5445	JF0101-2601B	JF0101-2601B	JF0501-2136	JF0501-2136	JF0501-2135	JF0501-19196	JF0501-19196
5451	22U	---	---	---	---	---	---
5453	---	---	---	---	22U	22U	---
5457	42U	25U	25U	33U	45U	82U	82U
5461	SC10009-03	SD10207-00	SRW0913DR-T06	SRW0913DR-T02	SC10015-00	SC10015-00	SC10009-03
5463	CHOKE COIL CU15	CHOKE COIL CU15	CHOKE COIL CU15	CHOKE COIL CU15	CHOKE COIL CU15	---	---
5464	---	---	---	---	---	---	---
5480	LAL04 A 18U	LAL04 A 15U	LAL04 A 47U	LAL04 A 47U	LAL04 A 27U	LAL04 A 22U	LAL04 A 27U
6400	1K	1K	1K	1K	1K	---	---
6401	BZX79-C47	BZX79-C47	BZX79-C47	BZX79-C47	BZX79-C47	---	---
6452	---	---	---	---	---	---	---
6460	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24	BY228/24
6462	---	---	---	---	BZX79-C10	---	BZX79-C12
6463	---	---	BZX384-C10	BZX384-C10	---	BZX384-C9V1	---
6464	---	BAS316	BAS316	---	---	---	---
6467	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316
6469	BYV95C	BYD33J	BYD33J	BYV95C	---	---	BYV95C
6490	---	---	---	---	---	---	---
7400	STP3NC60FP	STP3NC60FP	STP3NC60FP	STP3NC60FP	STP3NC60FP	---	---
7444	---	---	---	---	---	---	---
7450	PDTA114ET	PDTA114ET	PDTA114ET	PDTA114ET	PDTA114ET	PDTA114ET	PDTA114ET
7460	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX
9414	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER
9423	---	---	---	---	---	---	---
9424	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER	---	---
9426	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER	---	---
9451	---	---	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER
9460	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER
9462	---	---	---	---	---	---	---
9463	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER	JUMPER	---
9464	---	---	---	---	---	---	---
9635	---	---	---	---	---	---	---
9636	---	---	---	---	---	---	---
9646	---	---	---	---	---	---	---
9921	---	---	---	---	---	---	---

DIVERSITY TABLE FOR A12 FRONT IO + FRONT CNTL + HP

For Front Control

ITEM	55K NA	55K LA	NON 55K NA	NON 55K LA	IR + LED NA	IR + LED LA	KEYBOARD+ IR + LED LA
0231	---	YES	---	YES	---	YES	YES
0239	---	---	---	---	YES	YES	---
1600	YES	YES	YES	YES	---	---	YES
1601	YES	YES	YES	YES	---	---	YES
1602	YES	YES	YES	YES	---	---	YES
1603	YES	YES	YES	YES	---	---	YES
1606	YES	---	YES	---	YES	---	---
3681	*180	*180	390	390	---	---	390
3682	*270	*270	3K	3K	---	---	3K3
3684	*390	*390	560	560	---	---	560
3685	---	---	560	560	*1K5	---	560
3686	JMP	JMP	1K5	1K5	---	---	1K5
3687	*75	*75	---	---	---	---	---
3688	*68	*68	---	---	---	---	---
3689	*2K7	*2K7	---	---	---	---	---
4696	---	---	JMP	JMP	---	JMP	JMP
6681	---	---	BAT85	BAT85	---	---	BAT85
9184	YES	YES	---	---	---	---	---
9500	YES	---	YES	---	YES	---	---
9501	YES	---	YES	---	YES	---	---

ITEM	SINGLE SCART IN-DVD	DUAL SCART IN
3609	1K	10K
3538	---	75R

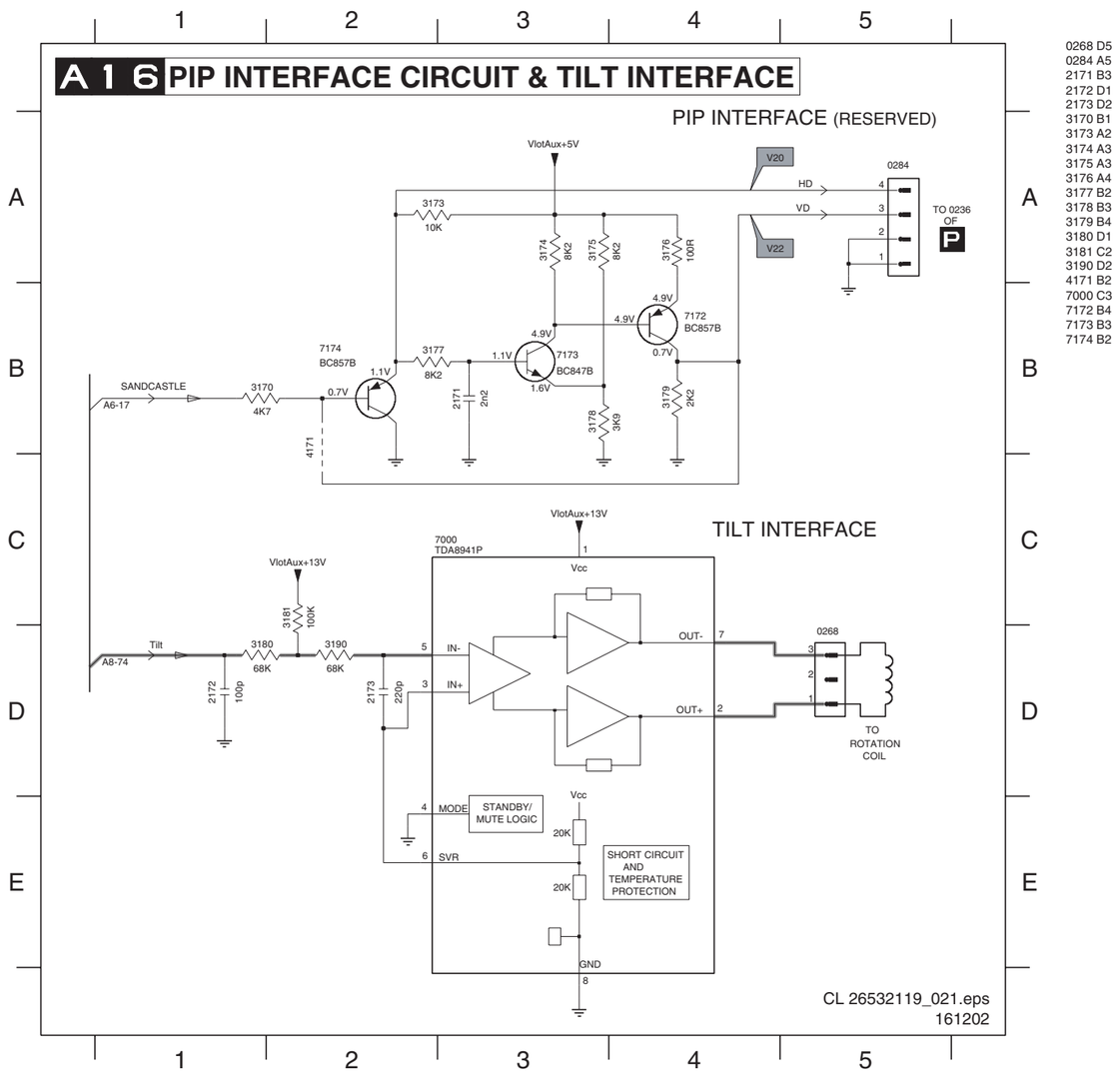
* 1% TOLERENCE RESISTER

ITEM	KEYBOARD IR+LED-GL	IR+LED-EU/LA/AP	TC.PNL+FI. PNL-INTERF EU/NA/AP	L2K2.FRNT 55K-NA	L2K2.FRNT 55K-LA	L2K2.FRNT NON-55K-NA	L2K2.FRNT NON-55K-LA	IR+LED.55K NA
0214	---	---	YES	---	---	---	---	---
0239	---	YES	YES	---	---	---	---	YES
1600	YES	---	---	YES	YES	YES	YES	---
1601	YES	---	---	YES	YES	YES	YES	---
1602	YES	---	---	YES	YES	YES	YES	---
1603	YES	---	---	YES	YES	YES	YES	---
1606	---	---	---	YES	YES	YES	---	YES
2691	10uF	10uF	---	10uF	10uF	10uF	10uF	10uF
3681	10uF	---	---	180R	180R	390R	390R	---
3683	3K3	---	---	270R	270R	3K3	3K3	---
3683	390R	---	---	390R	390R	390R	390R	---
3684	560R	---	---	390R	390R	560R	560R	---
3685	560R	---	---	---	---	560R	1K5	1K5
3686	1K5	---	---	JUMPER	JUMPER	1K5	---	---
3687	---	---	---	75R	75R	---	---	---
3688	---	---	---	68R	68R	---	---	---
3689	---	---	---	2K7	2K7	---	330R	---
3691	330R	330R	---	330R	330R	220R	220R	330R
3693	330R	220R	---	220R	220R	220R	YES	220R
4696	YES	---	---	---	---	YES	BAT85	---
6681	BAT85	---	---	---	---	BAT85	YES	---
6691	YES	YES	---	YES	YES	YES	YES	YES
6692	YES	YES	---	YES	YES	YES	YES	YES
9184	YES	---	---	YES	YES	---	---	---

ITEM	SNDAMP-2x10W-ST-EU	SNDAMP-2x5W-ST-EU/AP	SNDAMP-2x5W-VD-ST-EU	SNDAMP-2x10W-VD-ST-EU
2604	10uF	---	---	10uF

CL 36532039_001.eps
250403

Mono Carrier: PIP Interface Circuit + Tilt Interface

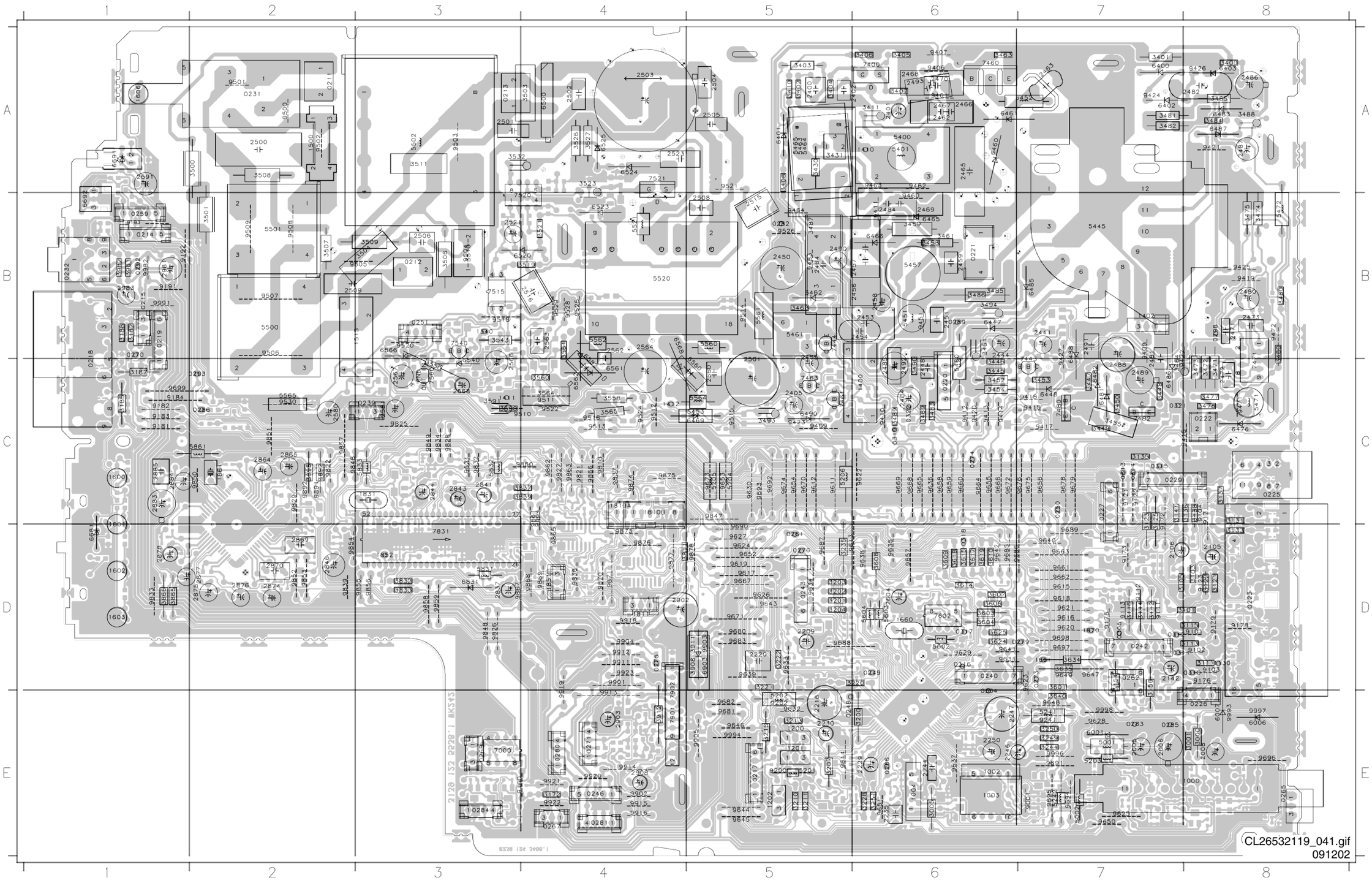


0268 D5
0284 A5
2171 B3
2172 D1
2173 D2
3170 B1
3173 A2
3174 A3
3175 A3
3176 A4
3177 B2
3178 B3
3179 B4
3180 D1
3181 C2
3190 D2
4171 B2
7000 C3
7172 B4
7173 B3
7174 B2

Mono Carrier: Mapping Top Side

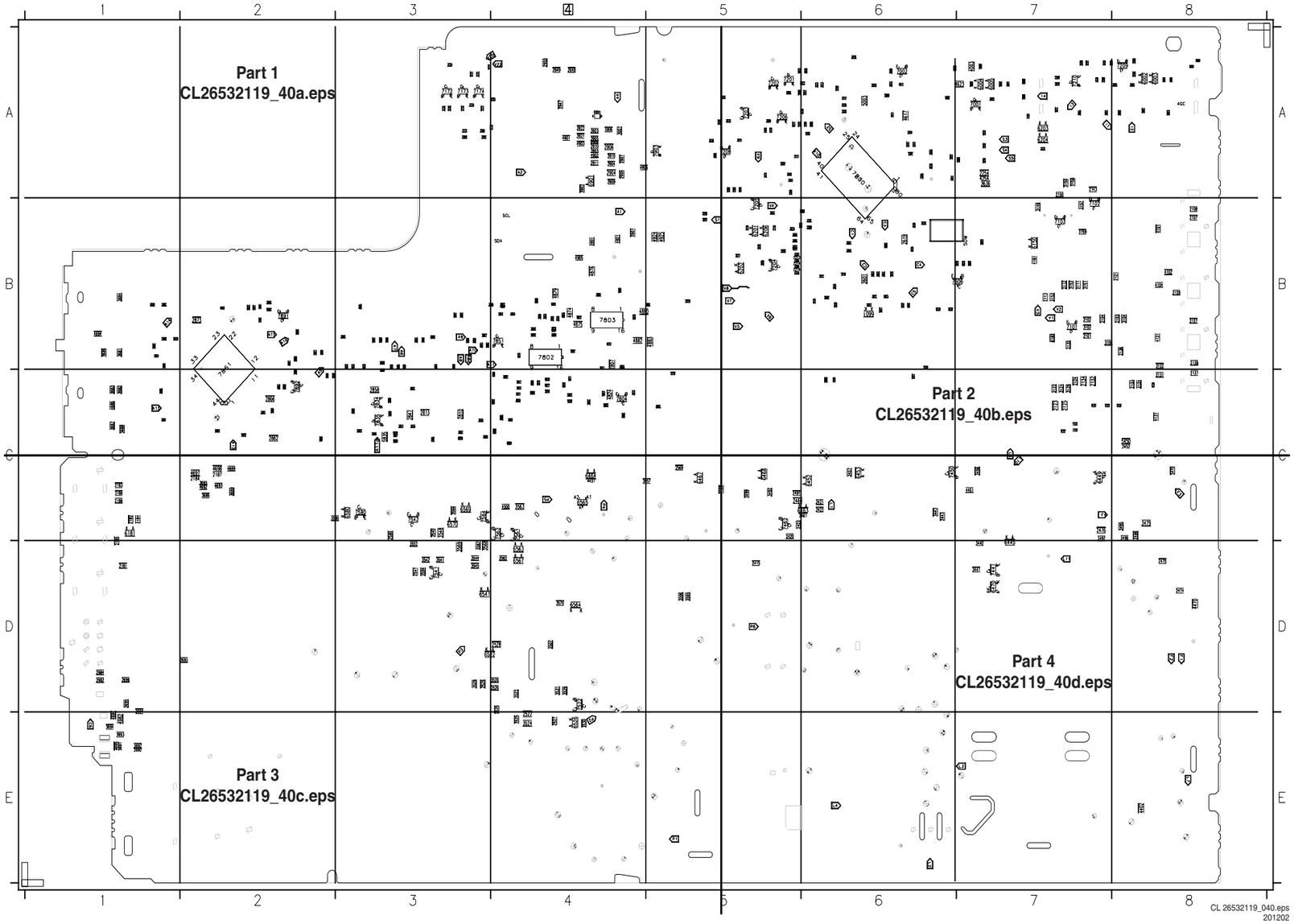
0211	A2	1402	B7	2484	B6	3136	C8	3486	B6	5445	B7	7463	C5	9500	A2	9659	C6	9868	D4
0212	B3	1410	A6	2485	C6	3137	C8	3487	B5	5451	B6	7471	C8	9501	A2	9660	C6	9869	D4
0213	A3	1411	C3	2486	A8	3138	C8	3488	A8	5452	A7	7480	C7	9502	A2	9661	D7	9870	D4
0214	B1	1412	C4	2487	A8	3141	C7	3489	C6	5453	C5	7482	C7	9503	A3	9662	D7	9871	D4
0215	B1	1500	A2	2488	C7	3154	D7	3490	C6	5457	B6	7515	B3	9504	B3	9663	D7	9873	D4
0217	E5	1515	B3	2489	C7	3156	D7	3493	C5	5461	B5	7520	B4	9505	B3	9664	C6	9874	C4
0218	C1	1530	B5	2490	B5	3172	E4	3494	B6	5463	A5	7521	A4	9506	B2	9665	C6	9875	C4
0219	B1	1531	B5	2491	B7	3182	B1	3500	A2	5464	A5	7540	B3	9507	B2	9666	C6	9876	D4
0220	C6	1532	B4	2492	C6	3185	C1	3501	B2	5465	A5	7560	C3	9508	B2	9667	D5	9877	D4
0221	B6	1533	B4	2493	A6	3187	C1	3503	A4	5471	C8	7602	D6	9509	B2	9668	C6	9878	D5
0222	C8	1534	B4	2500	A2	3188	B1	3504	B3	5472	B8	7831	D3	9510	C4	9669	C6	9891	C2
0223	D8	1535	B4	2501	A3	3200	E6	3506	B3	5480	C6	7901	E4	9511	C4	9670	C5	9892	C2
0225	C8	1540	B3	2502	A4	3201	D5	3507	B2	5500	B2	7902	E4	9512	C4	9671	D5	9901	D4
0226	E8	1600	C1	2503	A4	3202	D5	3508	A2	5501	B2	9001	E7	9513	C4	9672	C6	9902	E4
0227	C7	1601	C1	2504	A5	3203	D5	3509	B3	5502	A3	9101	D8	9514	B5	9673	C5	9903	D5
0229	C7	1602	D1	2505	A5	3204	D5	3510	B3	5520	B4	9102	D8	9515	C5	9674	C5	9904	D4
0231	A2	1603	D1	2506	B3	3207	E5	3511	A3	5521	B4	9103	D8	9516	C4	9675	C7	9905	E5
0232	B1	1606	A1	2508	B5	3210	E5	3519	B4	5560	B5	9104	C8	9518	B3	9676	C7	9911	D4
0239	C3	1660	D6	2509	B2	3211	E5	3521	B4	5561	B5	9111	D7	9520	B3	9678	C7	9912	D4
0240	D6	1661	D7	2515	B5	3213	E5	3523	A4	5562	B4	9112	D7	9521	A5	9679	C7	9913	E4
0242	D7	1670	D7	2516	B4	3216	E5	3526	A4	5564	C5	9113	D7	9522	C4	9680	D5	9914	E4
0243	D5	1810A	C4	2521	B3	3220	D6	3527	A4	5565	C2	9121	C7	9524	C4	9681	E5	9915	E4
0246	E4	1810B	C4	2523	A4	3221	D5	3532	A3	5602	D6	9122	C7	9525	B4	9682	E5	9916	E4
0248	E5	1811	D4	2560	C5	3222	D5	3543	B3	5603	D6	9123	D8	9526	B5	9683	D5	9918	D4
0249	D6	1831	C3	2561	C5	3228	E6	3550	C3	5604	D6	9124	C7	9528	B4	9685	D6	9919	D4
0250	C7	1851	D4	2562	B4	3235	D5	3558	C4	5831	D3	9125	C7	9529	B4	9686	D6	9920	E4
0251	B3	1852	D3	2563	B4	3244	E7	3560	C4	5832	C3	9160	E3	9530	C2	9687	D5	9921	E4
0259	B1	1861	C2	2564	B4	3249	E7	3561	B4	5833	C3	9171	C8	9531	A4	9688	D5	9922	E4
0261	D5	2005	E7	2566	C3	3250	E7	3564	C4	5861	C2	9172	C7	9611	C5	9689	D7	9923	D4
0262	D7	2006	E7	2567	C3	3251	E6	3565	C4	6001	E7	9173	D7	9612	C5	9690	D5	9982	B1
0265	E8	2008	E8	2568	C3	3400	A8	3590	C3	6006	E8	9175	D7	9613	D5	9691	E7	9991	B1
0266	E6	2105	D8	2580	C2	3401	A7	3591	C3	6007	E8	9176	D8	9614	E5	9692	C5	9993	E8
0267	E4	2106	D7	2581	C3	3402	A5	3601	D7	6400	A7	9178	D8	9615	D7	9693	C5	9994	E5
0268	E3	2142	D7	2604	D6	3403	A5	3603	D6	6401	A5	9179	D8	9616	D7	9694	E7	9996	E7
0270	B1	2209	D5	2691	A1	3404	A5	3604	D6	6402	A7	9181	C1	9617	D5	9695	E7	9997	E8
0271	E4	2216	E5	2837	D3	3405	A6	3606	D6	6403	A8	9182	C1	9618	D7	9696	E8	9998	E7
0273	D7	2220	D5	2841	C3	3406	A6	3607	D6	6447	B6	9183	C1	9619	D5	9697	D7		
0274	C6	2229	E6	2843	C3	3407	A6	3608	D6	6448	C7	9184	C1	9620	D7	9698	D7		
0275	D4	2230	E5	2844	C3	3408	A5	3609	D6	6460	A6	9191	B1	9621	D7	9699	C1		
0276	D5	2235	E6	2846	D2	3410	A5	3610	D6	6461	A6	9192	B1	9622	C6	9810	C4		
0277	B1	2244	E6	2864	C2	3411	A6	3614	D6	6462	B5	9193	B1	9623	D7	9821	C4		
0279	D7	2246	E6	2865	C2	3430	A5	3615	D6	6465	B6	9200	E5	9624	D5	9822	C2		
0280	E4	2247	E6	2869	D2	3431	A5	3617	D6	6466	B6	9202	E5	9625	E7	9825	C3		
0281	E4	2250	E6	2870	D2	3445	C6	3618	D6	6469	C5	9206	C5	9626	D5	9826	D3		
0282	B5	2400	A5	2874	D2	3446	C6	3619	D6	6476	C8	9241	E7	9627	D5	9827	C4		
0283	E7	2401	A6	2875	D2	3447	C7	3624	D6	6481	C7	9406	A6	9628	E7	9828	C3		
0284	E3	2402	A6	2876	D2	3448	C7	3625	D6	6482	C7	9407	A6	9629	D6	9829	C2		
0285	E7	2404	C6	2877	D2	3449	C7	3634	D7	6483	A8	9408	B7	9630	C5	9831	C3		
0286	C2	2405	C5	2878	D1	3450	C7	3635	D7	6485	B7	9409	C5	9631	D6	9832	C3		
0289	B6	2441	B7	2883	C1	3451	B6	3640	E7	6486	C7	9410	C6	9632	E5	9833	D1		
0292	B1	2444	B6	2884	C1	3452	C6	3811	D4	6487	A8	9411	B6	9633	D5	9834	C3		
0293	C2	2448	C6	2885	C1	3453	C7	3832	D3	6488	B7	9412	C6	9634	D5	9837	C4		
0298	B8	2450	B5	2902	D4	3454	C6	3833	D3	6490	C5	9413	C6	9635	D6	9838	D4		
0304	E6	2451	B6	2903	E4	3455	C7	3837	C4	6500	A4	9414	C6	9636	C6	9839	D2		
0305	D7	2453	B6	2908	E4	3458	B6	3839	C4	6520	B4	9415	C7	9637	E6	9846	C2		
0310	D8	2454	B6	2981	B1	3459	B6	3865	D1	6523	B4	9416	C8	9638	D6	9847	C5		
0311	D7	2455	B5	2983	B1	3460	B8	3866	D1	6524	A4	9417	C7	9639	D5	9848	D3		
0312	D7	2456	B6	3000	E8	3461	B6	3892	C2	6525	A4	9418	C7	9640	D7	9849	C3		
0313	C7	2457	B6	3001	E8	3463	A6	3895	C2	6540	C3	9419	B8	9641	D6	9850	C2		
0314	C7	2458	B6	3005	E6	3464	C7	3908	D5	6560	C5	9420	C6	9642	D6	9851	C2		
0315	C7	2459	B6	3101	D8	3465	A8	3911	D5	6561	C4	9421	A8	9643	D5	9852	D2		
0316	D6	2462	A6	3103	D8	3468	B5	3912	E4	6562	C4	9422	B7	9644	E5	9853	D2		
0317	D6	2463	A7	3105	D7	3469	C6	3981	B1	6566	B3	9423	C5	9645	E5	9854	D2		
0318	D6	2464	B5	3111	D8	3471	C8	3982	B1	6568	B4	9424	A7	9646	E5	9855	D3		
0319	C6	2465	A6	3112	D7	3472	C8	5001	E7	6582	C4	9425	B8	9647	D7	9856	D3		
0321	C7	2466	A6	3113	D8	3473	C8	5002	E7	6681	D1	9426	A8	9648	E7	9857	C2		
0322	C6	2467	A6	3114	D7	3474	B8	5201	E5	6691	A1	9427	B7	9649	D7	9858	D3		
1000	E8	2468	A6	3115	D8	3475	B8	5202	E5	6692	B1	9451	B6	9650	E7	9859	D3		
1002	E6	2469	B6	3116	D7	3477	C8	5203	E7	6831	D3	9453	B5	9651	E6	9860	C4		
1003	E6	2470	A6	3121	D8	3478	C8	5204	C5	6903	D5	9460	B6	9652	D5	9861	C4		
1004	E6	2471	B8	3122	D8	3480	B8	5205	C5	7000	E3	9461	A6	9653	C5	9862	C4		
1130	D8	2472	C8	3123	C7	3481	A7	5206	C5	7400	A6	9462	A6	9654	C5	9863	C4		
1200	E5	2473	B8	3125	C7	3482	A7	5241	E7	7443	C7	9463	A6	9655	C6	9864	C4		
1201	E5	2480	B8	3131	C8	3483	C6	5242	E7	7444	B5	9464	B5	9656	C7	9865	D4		
1202	E5	2481	C7	3133	D8	3484	A8	5400	A6	7460	A6	9471	C8	9657	D6	9866	C4		
1400	C6	2482	A8	3135	C7	3485	B6	5401	A6	7461	C5	9472	B8	9658	C6	9867	D3		

Layout Mono Carrier: Top Side



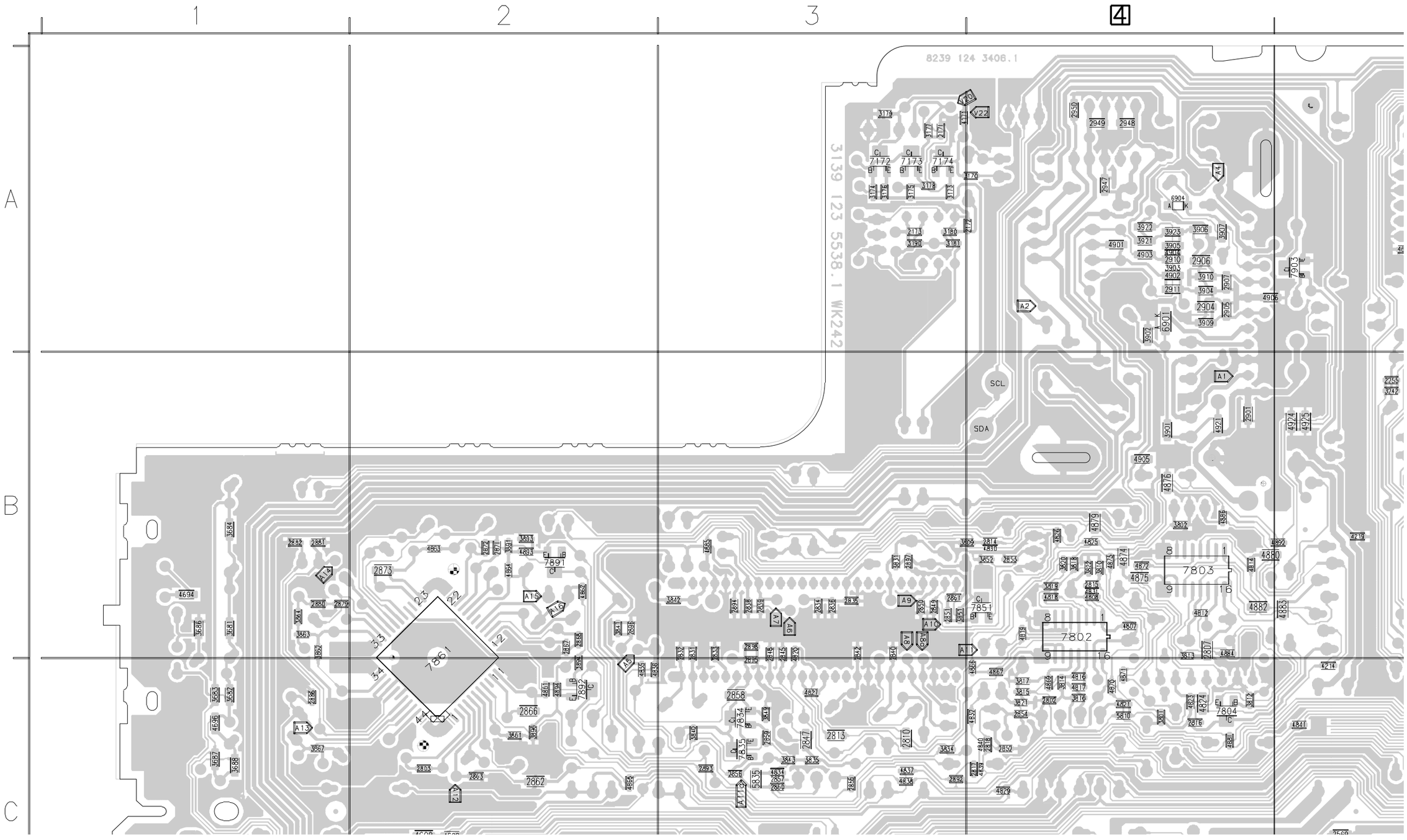
CL26532119_041.gif
091202

Layout Mono Carrier (Overview Bottom Side)



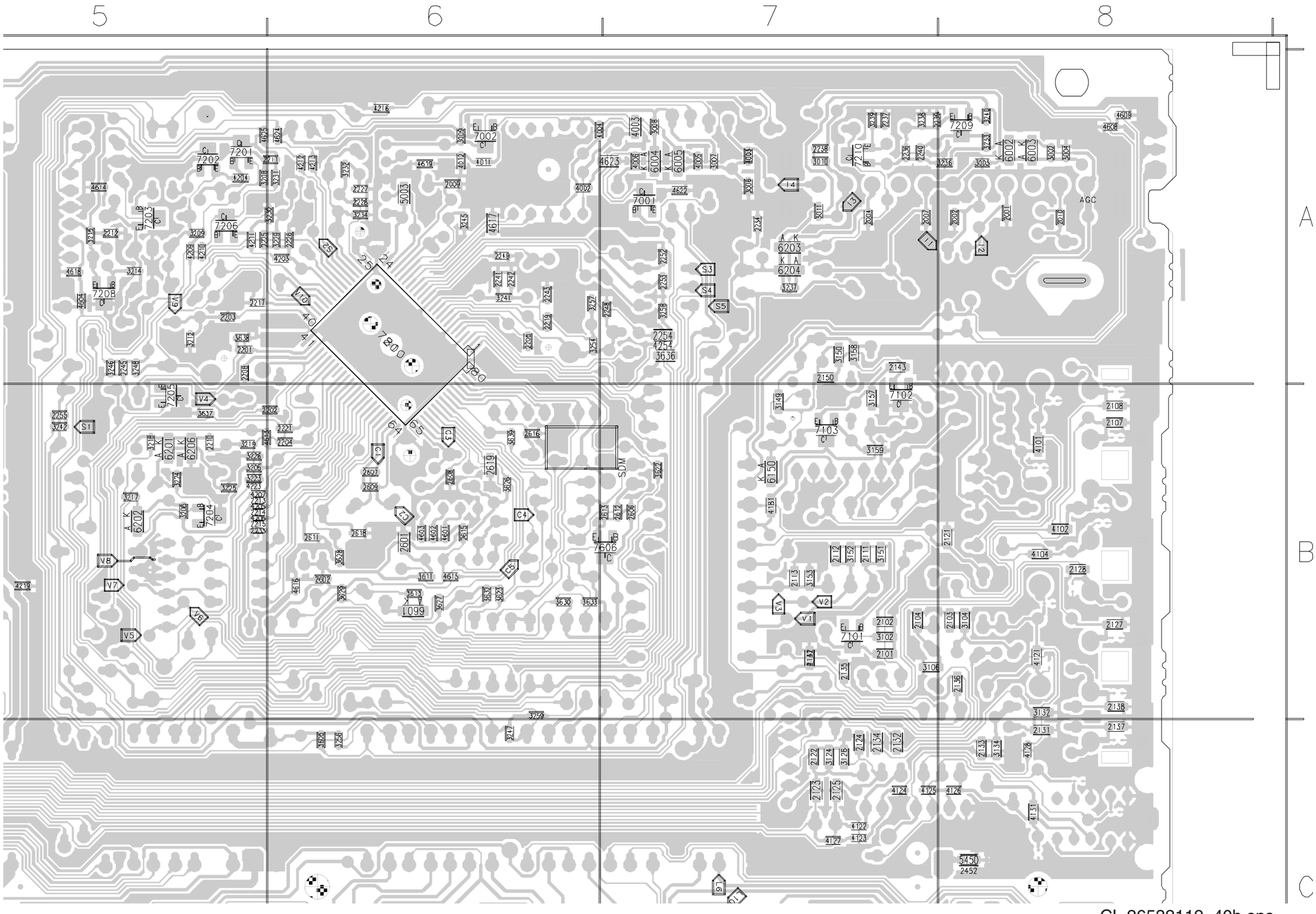
2001	A8	2237	A7	2832	B3	3011	A7	3442	D7	3693	E1	4127	C7	4826	B4	6449	C7
2002	A8	2238	A7	2833	B3	3102	B7	3443	C6	3694	E1	4128	C8	4827	C3	6452	C6
2003	A7	2239	A7	2834	B3	3104	B8	3456	C7	3695	C2	4131	C8	4829	C4	6453	C6
2004	A7	2240	A7	2835	B3	3106	B7	3457	C6	3801	C4	4132	B7	4830	B4	6463	C6
2007	A7	2241	A6	2836	B3	3124	C7	3470	C8	3802	B4	4171	A3	4831	B4	6464	C4
2009	A6	2242	A6	2838	B3	3126	C7	3479	C8	3809	B4	4181	B7	4832	C4	6467	C5
2010	A8	2243	A6	2839	B3	3132	B8	3491	C5	3810	B4	4203	A6	4834	C3	6468	C5
2101	B7	2245	A5	2840	B3	3134	C8	3492	C5	3812	C4	4204	A5	4835	C2	6470	D7
2102	B7	2248	A7	2842	B3	3149	B7	3495	C8	3813	B4	4205	B5	4836	C2	6522	D3
2103	B8	2249	A6	2845	B3	3150	A7	3496	C8	3814	C4	4206	B5	4837	C3	6526	E4
2104	B7	2252	A7	2847	C3	3151	B7	3497	C7	3815	C4	4207	B5	4838	C3	6541	D3
2107	B8	2253	A7	2848	B3	3152	B7	3498	C8	3816	C4	4209	A5	4839	C4	6563	D4
2108	B8	2254	A7	2849	B3	3153	B7	3499	C5	3817	C4	4210	A5	4840	C4	6564	D4
2111	B7	2255	B5	2850	B3	3157	B7	3520	D4	3818	B4	4211	A5	4841	C5	6565	C4
2112	B7	2415	D5	2851	B3	3158	A7	3522	D4	3819	B4	4212	A6	4861	C2	6567	D4
2113	B7	2420	C5	2852	C4	3159	B7	3524	E4	3820	B4	4213	A6	4862	B2	6569	C3
2121	B8	2421	C6	2853	B4	3170	A4	3525	E4	3821	C4	4214	C5	4863	B2	6570	C3
2122	C7	2422	C6	2854	C4	3173	A3	3528	D3	3822	B4	4216	A6	4864	B2	6580	C3
2123	C7	2423	C5	2855	C3	3174	A3	3529	D4	3831	B3	4219	B5	4865	C2	6601	B6
2124	C7	2443	C6	2856	C3	3175	A3	3530	E4	3834	C3	4223	B5	4866	C4	6901	A4
2125	C7	2452	C8	2857	C3	3176	A3	3531	D4	3835	C3	4254	A7	4867	C4	6904	A4
2127	B8	2460	C5	2858	C3	3177	A3	3541	D3	3840	C3	4401	C7	4869	C4	7001	A7
2128	B8	2461	C6	2859	C3	3178	A3	3542	D3	3841	B2	4402	E8	4870	C4	7002	A6
2131	C8	2474	D8	2860	C3	3179	A3	3544	D3	3842	B3	4430	C5	4871	C4	7101	B7
2132	C7	2475	D8	2861	B3	3180	A3	3545	D3	3843	C3	4431	C4	4872	B4	7102	B7
2133	C8	2476	C7	2862	C2	3181	A3	3548	C3	3849	C3	4470	D8	4873	B4	7103	B7
2134	C7	2507	D4	2863	C2	3184	C1	3552	D3	3851	B3	4500	C4	4874	B4	7172	A3
2135	B7	2520	D4	2866	C2	3186	C1	3557	C5	3852	B4	4601	B6	4875	B4	7173	A3
2136	B8	2522	E4	2867	B2	3190	A3	3562	D4	3861	C2	4602	B6	4876	B4	7174	A3
2137	C8	2525	D4	2868	B2	3205	B5	3563	C4	3862	B1	4603	B6	4879	B4	7200	A6
2138	B8	2526	D3	2871	B2	3206	B5	3566	C3	3863	B1	4604	A5	4880	B4	7201	A5
2141	B7	2527	E4	2872	B2	3208	A5	3567	D3	3864	B1	4608	A8	4881	C4	7202	A5
2143	A7	2528	D4	2873	B2	3209	A5	3568	D3	3867	C1	4609	A8	4882	B4	7203	A5
2150	A7	2540	C3	2879	B1	3212	A5	3569	D3	3891	B2	4613	B5	4883	B5	7204	B5
2171	A3	2541	D3	2880	B1	3214	A5	3570	D4	3893	B2	4614	A5	4884	B4	7205	B5
2172	A4	2569	C5	2881	B1	3215	A5	3580	C2	3894	C2	4615	B6	4885	B3	7206	A5
2173	A3	2590	C3	2882	B1	3217	B5	3594	D3	3896	C2	4616	B6	4886	B4	7208	A5
2181	D1	2601	B6	2886	C1	3218	B5	3595	D5	3901	B4	4617	A6	4892	B5	7209	A8
2182	C1	2602	B6	2892	C3	3219	B5	3596	D5	3902	A4	4618	A5	4893	B2	7210	A7
2183	C1	2606	B7	2893	C3	3223	B5	3605	C6	3903	A4	4619	A6	4894	C2	7441	D7
2184	C2	2607	B6	2894	B3	3224	B5	3611	B6	3904	A4	4622	A7	4901	A4	7450	C6
2185	D1	2608	B6	2895	C3	3225	B5	3613	B6	3905	A4	4623	A7	4902	A4	7462	C5
2186	C1	2609	B6	2896	B2	3226	B5	3622	B7	3906	A4	4624	A6	4903	A4	7522	D4
2187	C2	2611	B6	2897	B3	3229	A6	3623	B6	3907	A4	4625	A5	4904	A4	7541	D3
2201	A5	2612	B7	2898	B3	3230	A6	3626	B6	3909	A4	4691	E1	4905	B4	7542	C3
2202	B6	2613	B7	2901	B4	3231	A6	3627	B6	3910	A4	4692	C2	4906	A4	7561	C4
2203	A5	2615	B6	2904	A4	3232	A6	3628	B6	3921	A4	4693	C2	4921	B4	7562	C4
2204	B6	2616	B6	2905	A4	3233	A8	3629	B6	3922	A4	4694	B1	4924	B5	7564	C3
2205	A6	2618	B6	2906	A4	3234	A6	3630	B6	3923	A4	4695	E1	4925	B5	7580	C3
2208	A5	2619	B6	2907	A4	3236	A8	3632	B6	4001	A7	4696	C1	4982	E1	7606	B7
2210	B5	2692	E1	2910	A4	3237	A7	3633	B6	4002	A6	4697	C2	5003	A6	7802	B4
2211	A6	2693	D2	2911	A4	3238	A7	3636	A7	4003	A7	4698	C2	5450	C8	7803	B4
2212	A5	2694	D1	2947	A4	3239	A7	3637	B5	4004	A6	4699	C2	5810	C4	7804	C4
2213	B5	2695	D1	2948	A4	3240	A8	3638	A5	4005	A7	4807	B4	5835	C3	7834	C3
2214	B5	2696	D1	2949	A4	3241	A6	3639	B6	4006	A7	4808	B4	6002	A8	7835	C3
2215	B5	2802	C4	2950	A4	3242	B5	3681	B1	4011	A6	4812	B4	6003	A8	7851	B4
2217	A5	2803	C2	2982	D1	3245	A6	3682	C1	4012	A6	4814	B4	6004	A7	7861	C2
2219	A6	2807	B4	2984	D1	3246	A5	3683	C1	4101	B8	4816	C4	6005	A7	7891	B2
2221	B6	2810	C3	3002	A8	3247	C6	3684	B1	4102	B8	4817	C4	6150	B7	7892	C2
2225	A5	2813	C3	3003	A8	3248	A5	3685	C2	4104	B8	4818	B4	6181	C1	7903	A5
2226	A6	2814	B4	3004	A8	3254	A6	3686	B1	4121	B8	4819	B4	6201	B5		
2227	A6	2815	B4	3006	A7	3256	C6	3687	C1	4122	C7	4820	B3	6202	B5		
2228	A6	2816	C4	3007	A7	3257	A6	3688	C1	4123	C7	4821	C4	6203	A7		
2233	B5	2817	C4	3008	A7	3258	A7	3689	C2	4124	C7	4823	C4	6204	A7		
2234	A7	2818	C4	3009	A6	3259	B6	3691	E1	4125	C7	4824	C4	6206	B5		
2236	A7	2831	B3	3010	A7	3441	D7	3692	E1	4126	C8	4825	B4	6445	D7		

Layout Mono Carrier (Part 1Bottom Side)



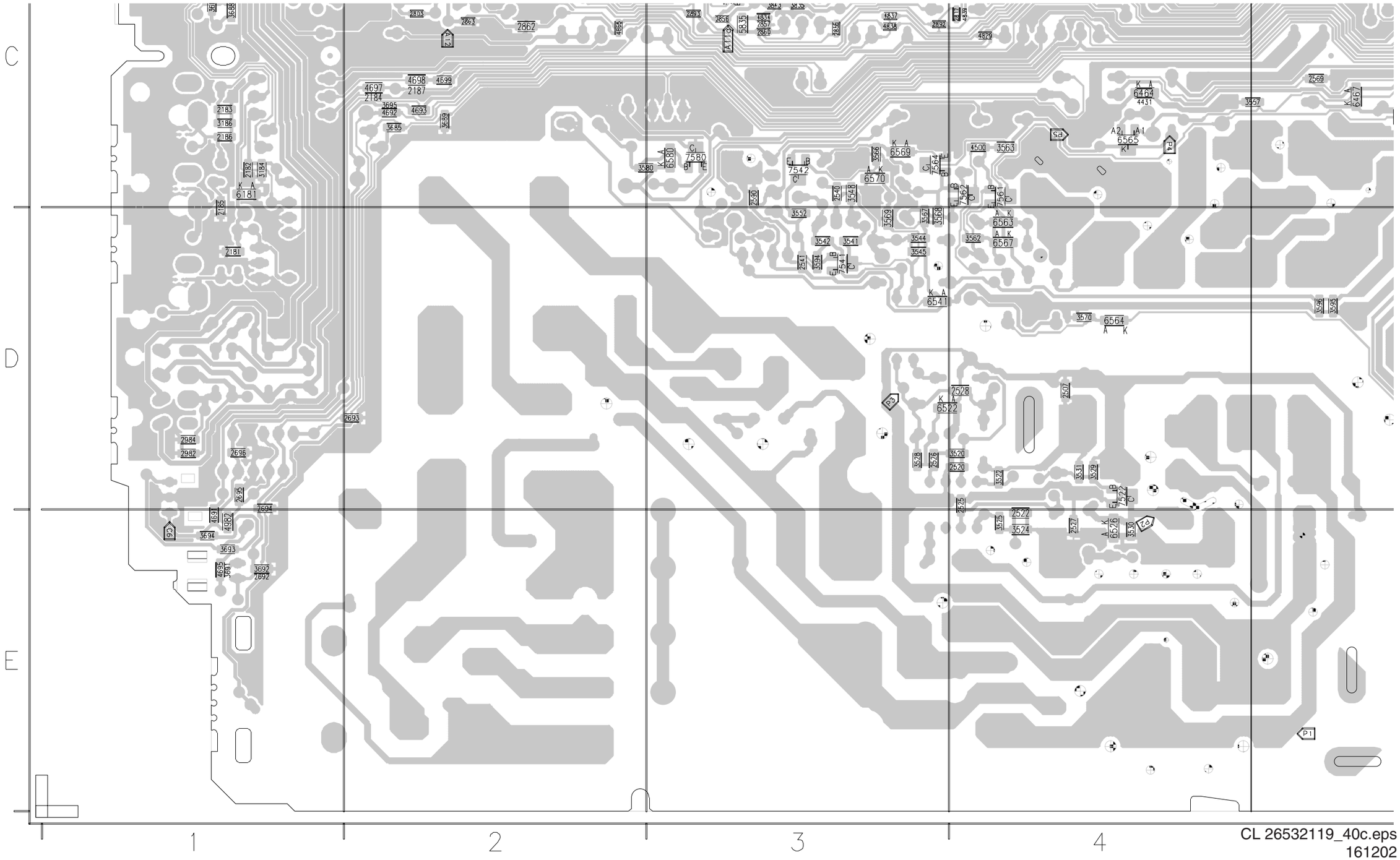
CL 26532119_40a.eps
161202

Layout Mono Carrier (Part 2 Bottom Side)



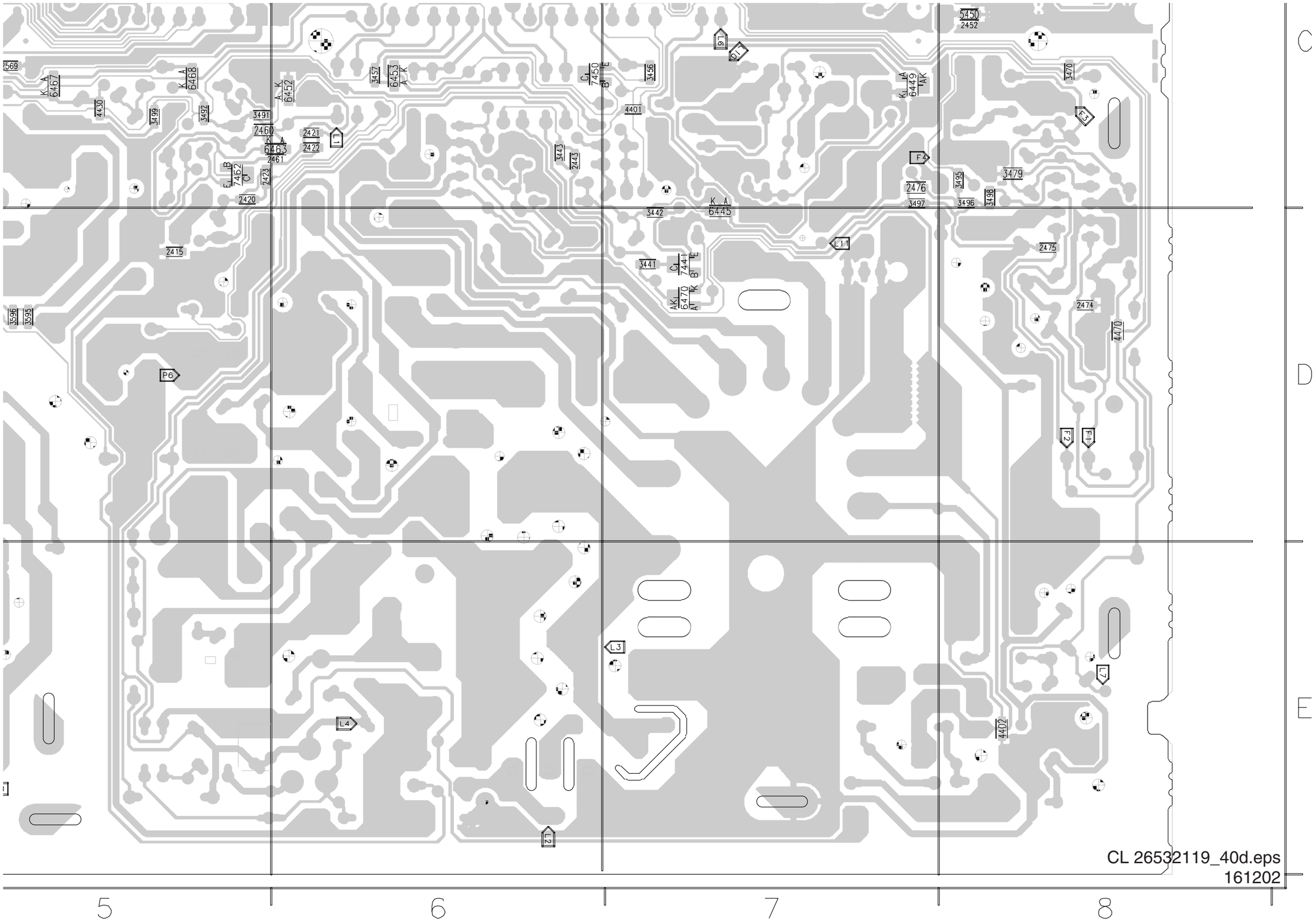
CL 26532119_40b.eps
161202

Layout Mono Carrier (Part 3 Bottom Side)



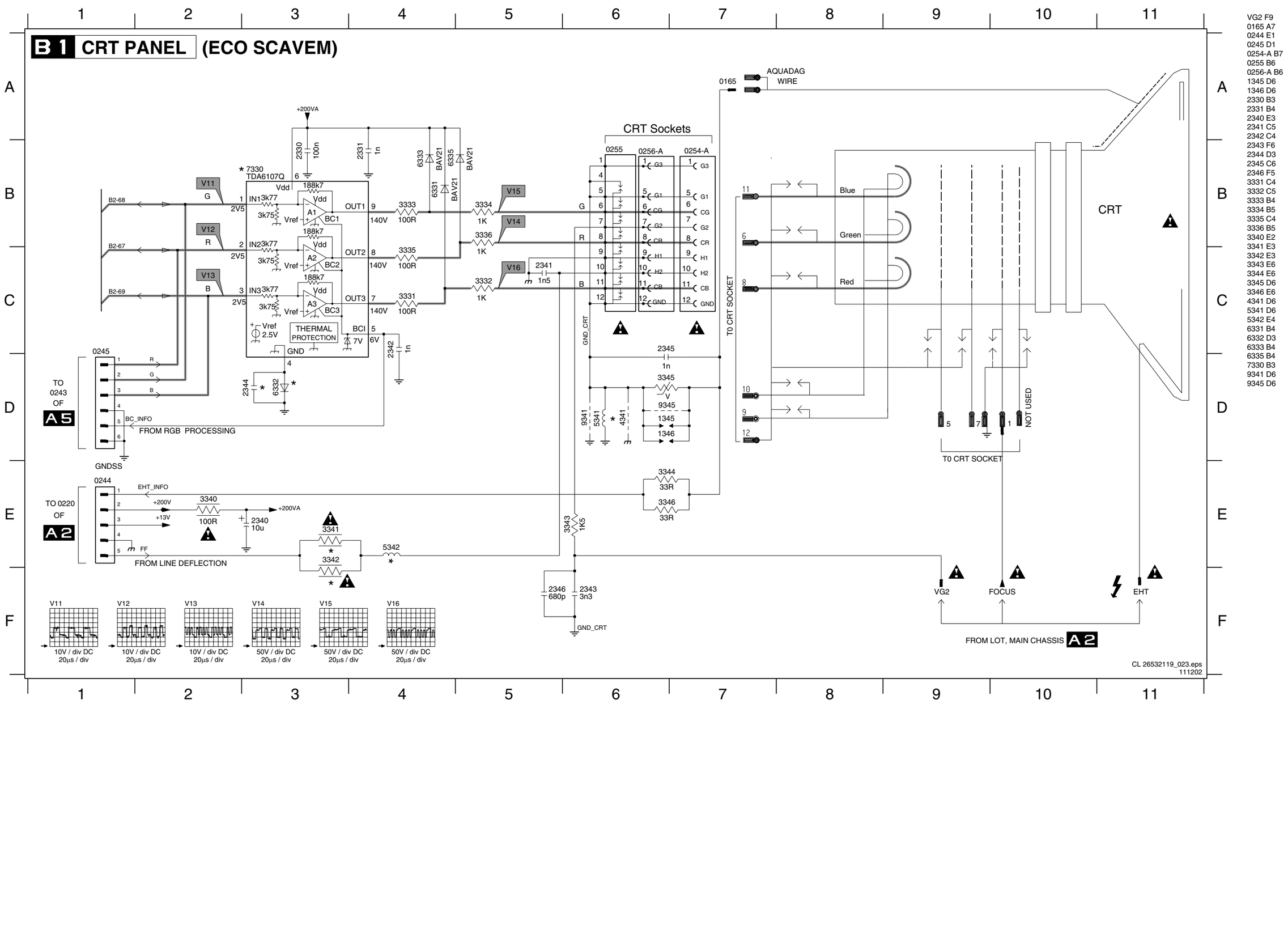
CL 26532119_40c.eps
161202

Layout Mono Carrier (Part 4 Bottom Side)



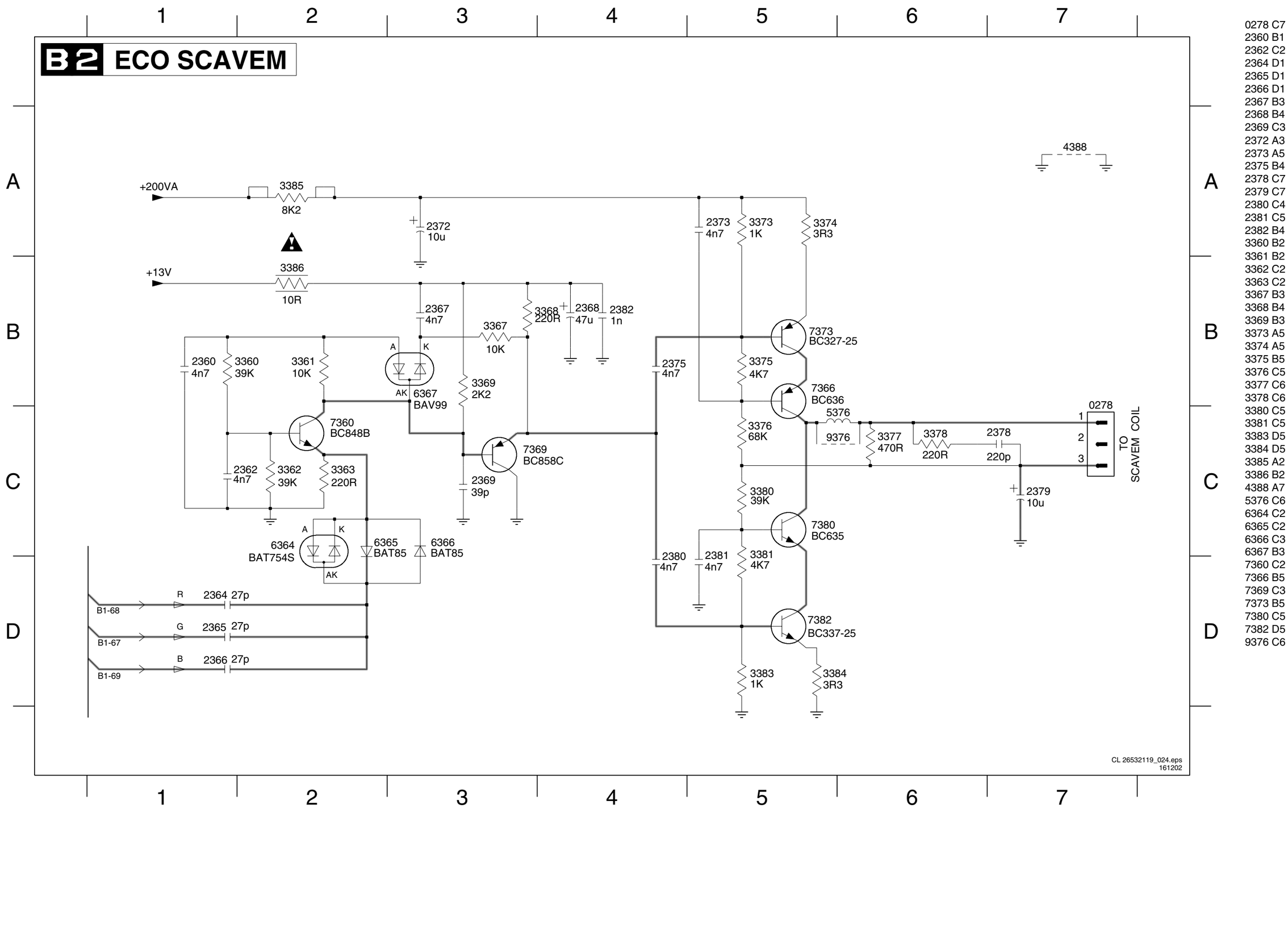
CRT Panel ECO SCAVEM

B 1 CRT PANEL (ECO SCAVEM)



VG2 F9
0165 A7
0244 E1
0245 D1
0254-A B7
0255 B6
0256-A B6
1345 D6
1346 D6
2330 B3
2331 B4
2340 E3
2341 C5
2342 C4
2343 F6
2344 D3
2345 C6
2346 F5
3331 C4
3332 C5
3333 B4
3334 B5
3335 C4
3336 B5
3340 E2
3341 E3
3342 E3
3343 E6
3344 E6
3345 D6
3346 E6
4341 D6
5341 D6
5342 E4
6331 B4
6332 D3
6333 B4
6335 B4
7330 B3
9341 D6
9345 D6

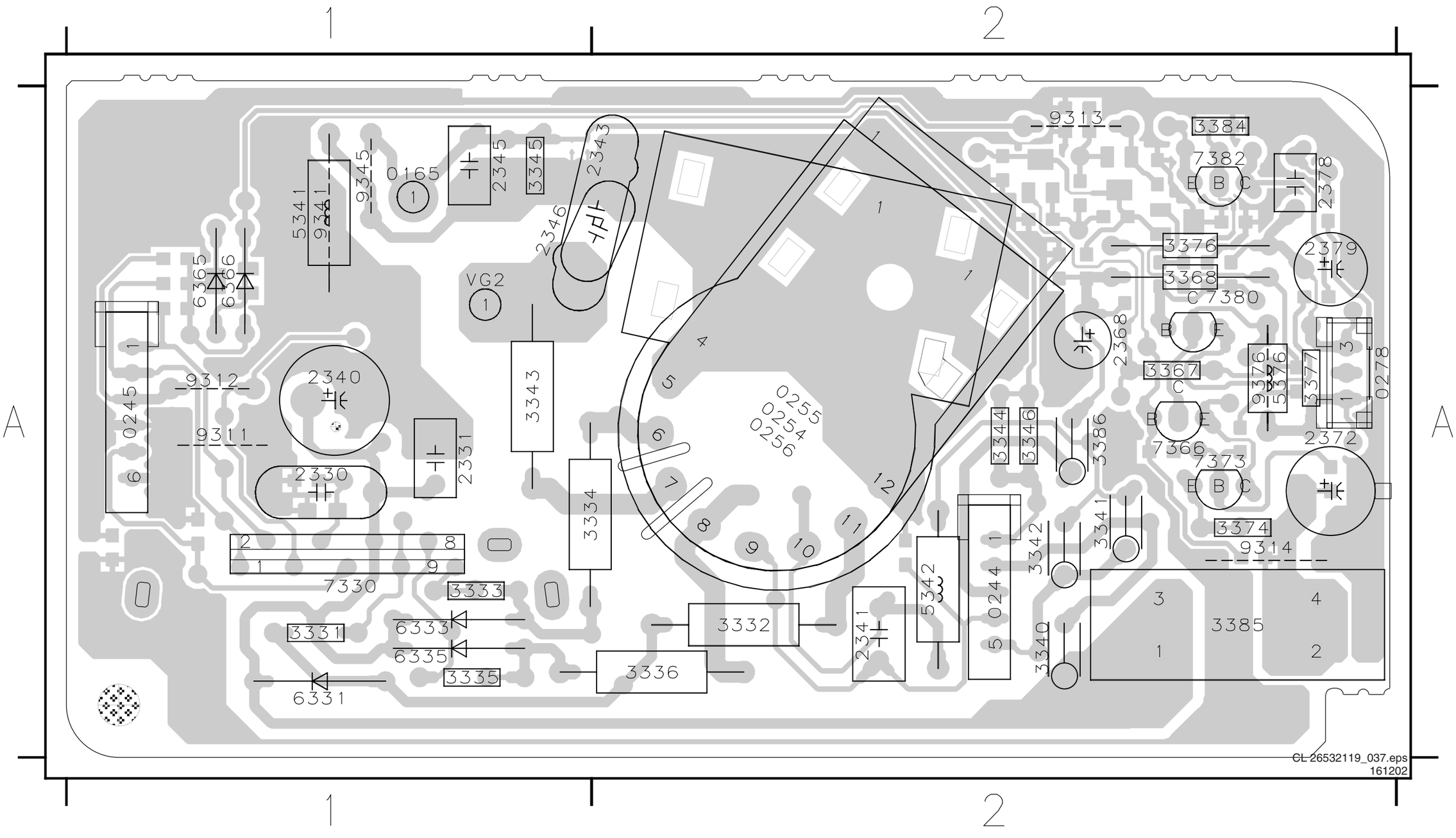
CRT Panel ECO SCAVEM



0278 C7
2360 B1
2362 C2
2364 D1
2365 D1
2366 D1
2367 B3
2368 B4
2369 C3
2372 A3
2373 A5
2375 B4
2378 C7
2379 C7
2380 C4
2381 C5
2382 B4
3360 B2
3361 B2
3362 C2
3363 C2
3367 B3
3368 B4
3369 B3
3373 A5
3374 A5
3375 B5
3376 C5
3377 C6
3378 C6
3380 C5
3381 C5
3383 D5
3384 D5
3385 A2
3386 B2
4388 A7
5376 C6
6364 C2
6365 C2
6366 C3
6367 B3
7360 C2
7366 B5
7369 C3
7373 B5
7380 C5
7382 D5
9376 C6

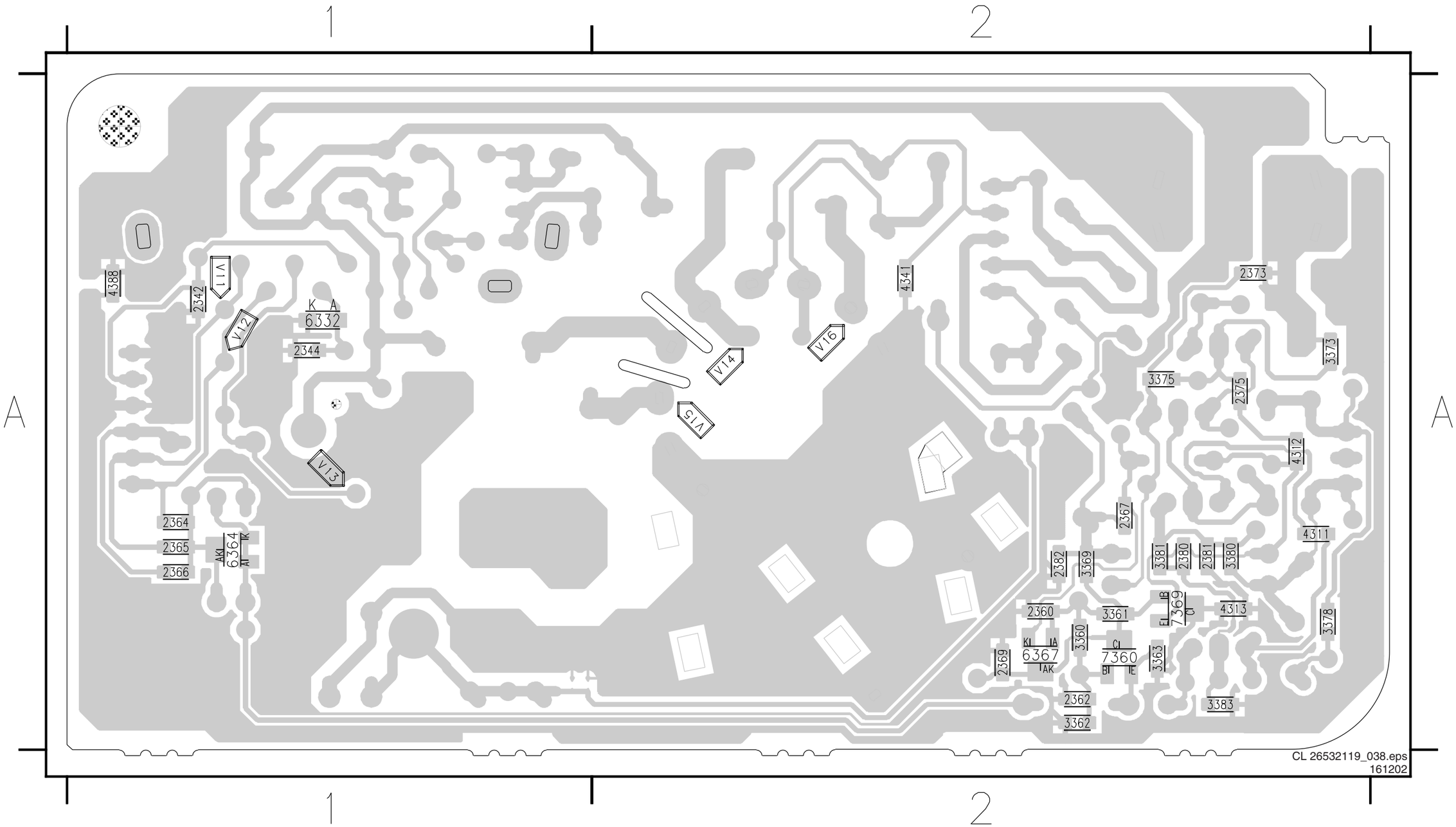
Layout CRT Panel (Top Side)

VG2	A1	0255	A2	2340	A1	2368	A2	3332	A2	3340	A2	3345	A1	3376	A2	5341	A1	6335	A1	7373	A2	9313	A2
0165	A1	0256	A2	2341	A2	2372	A2	3333	A1	3341	A2	3346	A2	3377	A2	5342	A2	6365	A1	7380	A2	9314	A2
0244	A2	0278	A2	2343	A2	2378	A2	3334	A1	3342	A2	3367	A2	3384	A2	5376	A2	6366	A1	7382	A2	9341	A1
0245	A1	2330	A1	2345	A1	2379	A2	3335	A1	3343	A1	3368	A2	3385	A2	6331	A1	7330	A1	9311	A1	9345	A1
0254	A2	2331	A1	2346	A1	3331	A1	3336	A2	3344	A2	3374	A2	3386	A2	6333	A1	7366	A2	9312	A1	9376	A2

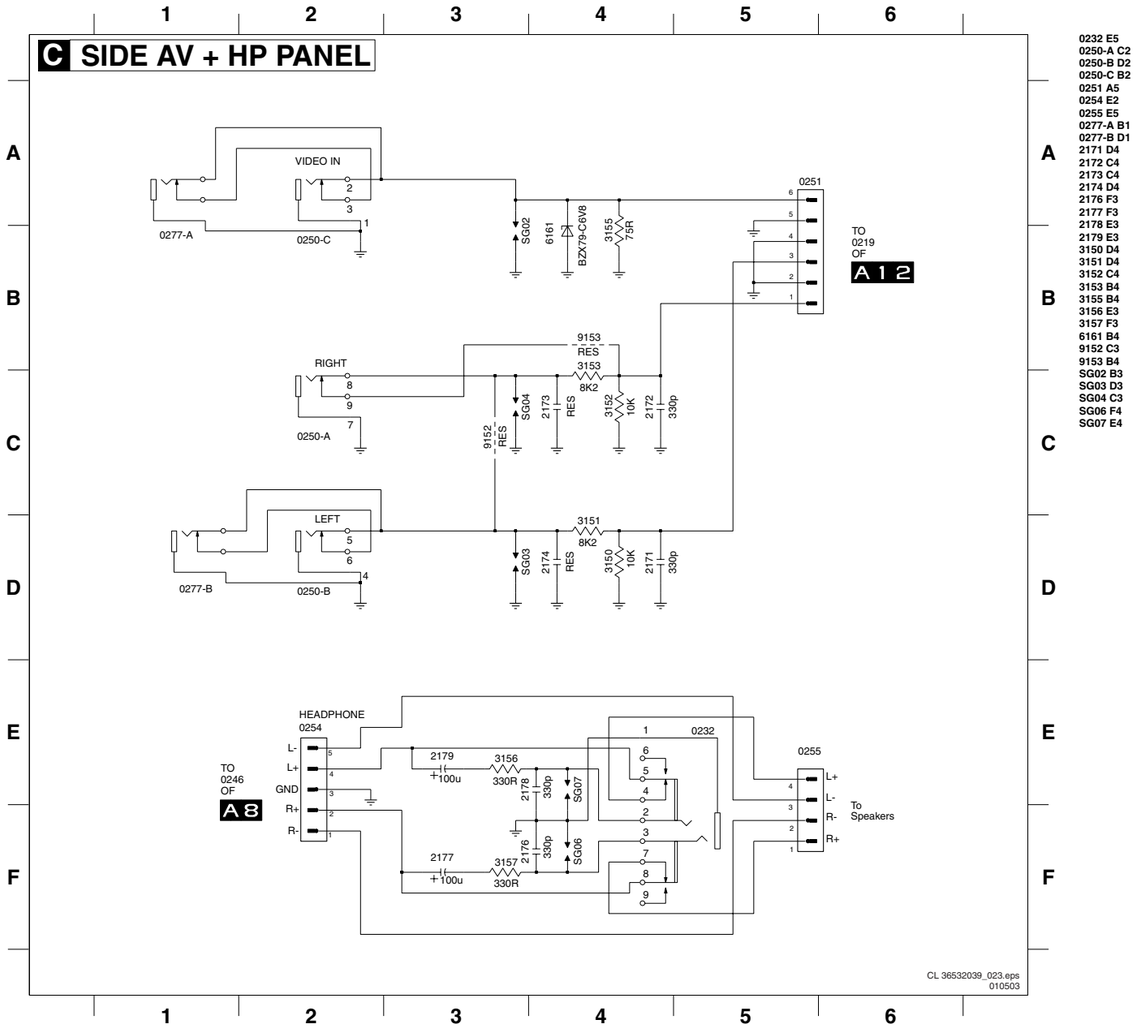


Layout CRT Panel (Bottom Side)

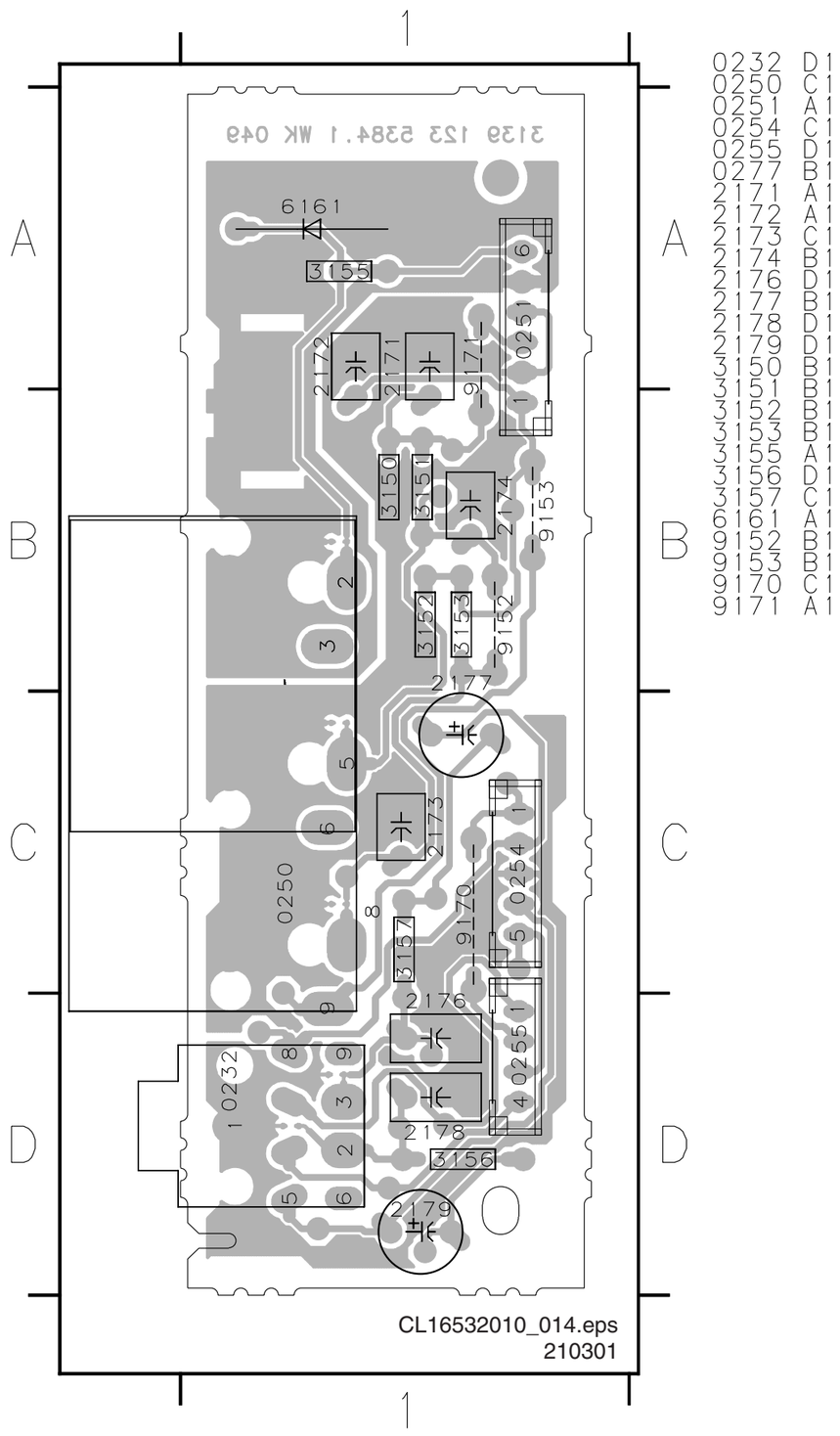
2342	A1	2365	A1	2375	A2	3361	A2	3375	A2	4311	A2	6332	A1
2344	A1	2366	A1	2380	A2	3362	A2	3378	A2	4312	A2	6364	A1
2360	A2	2367	A2	2381	A2	3363	A2	3380	A2	4313	A2	6367	A2
2362	A2	2369	A2	2382	A2	3369	A2	3381	A2	4341	A2	7360	A2
2364	A1	2373	A2	3360	A2	3373	A2	3383	A2	4388	A1	7369	A2



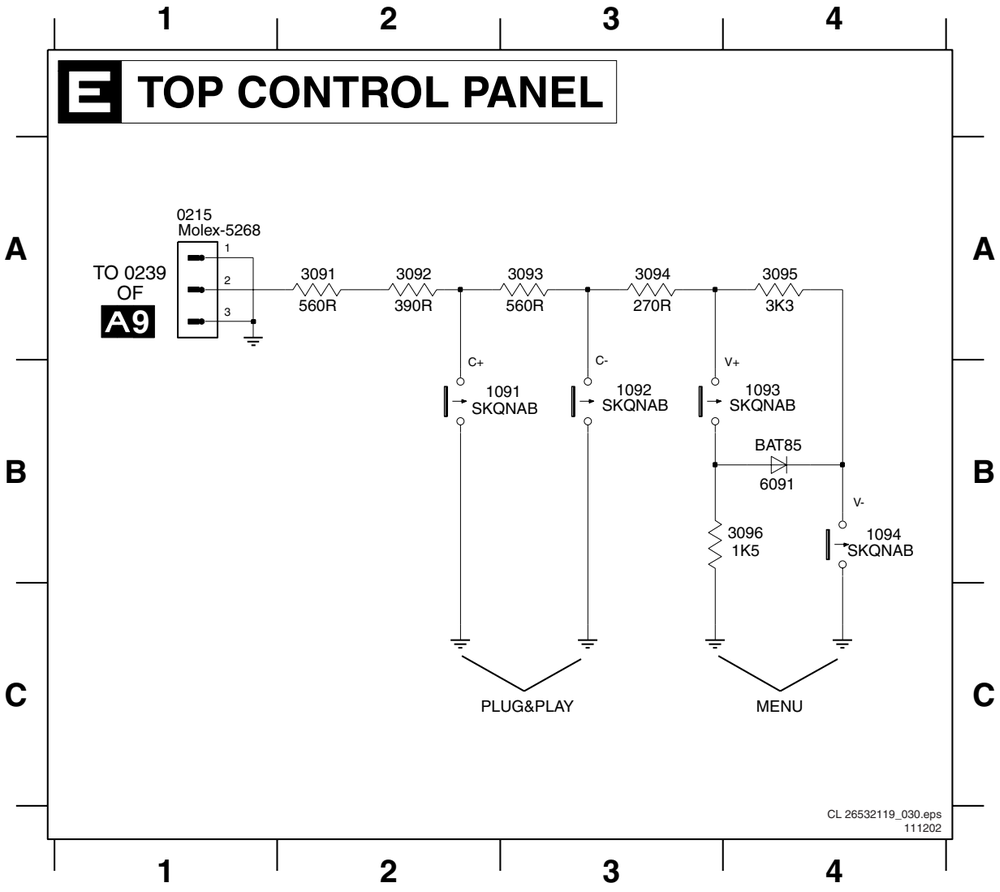
Side AV + HP Panel



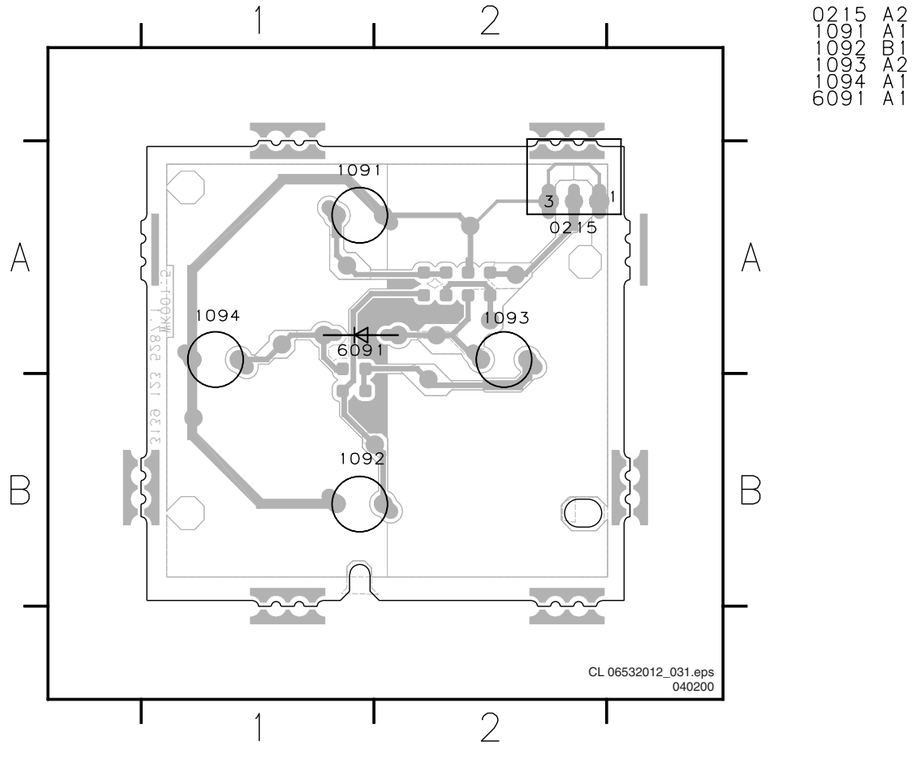
Layout Side AV + HP Panel



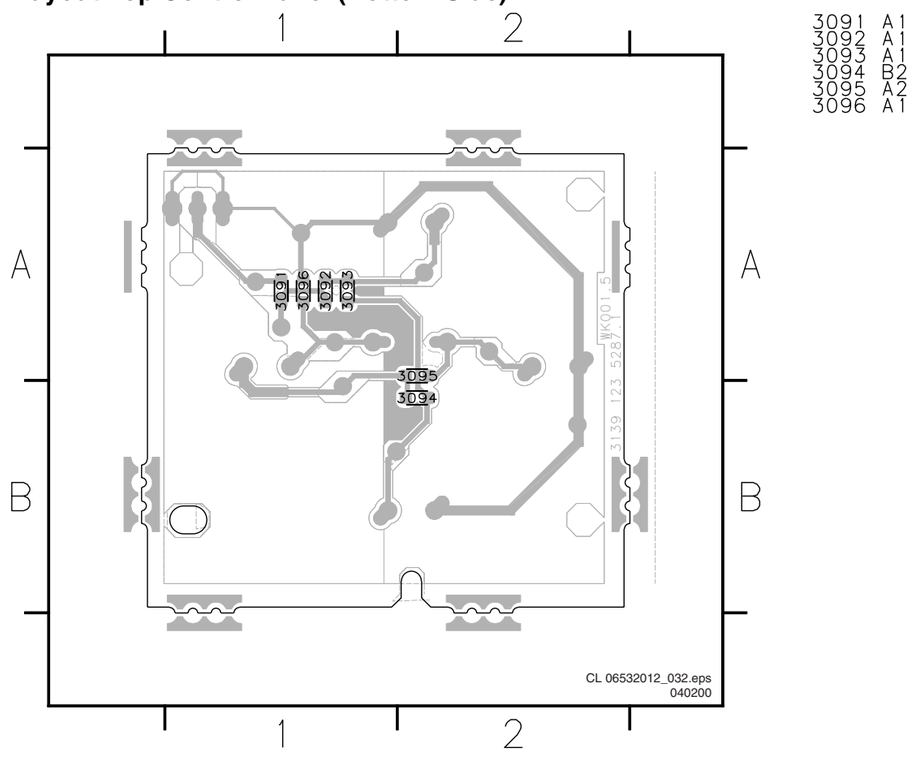
Top Control Panel



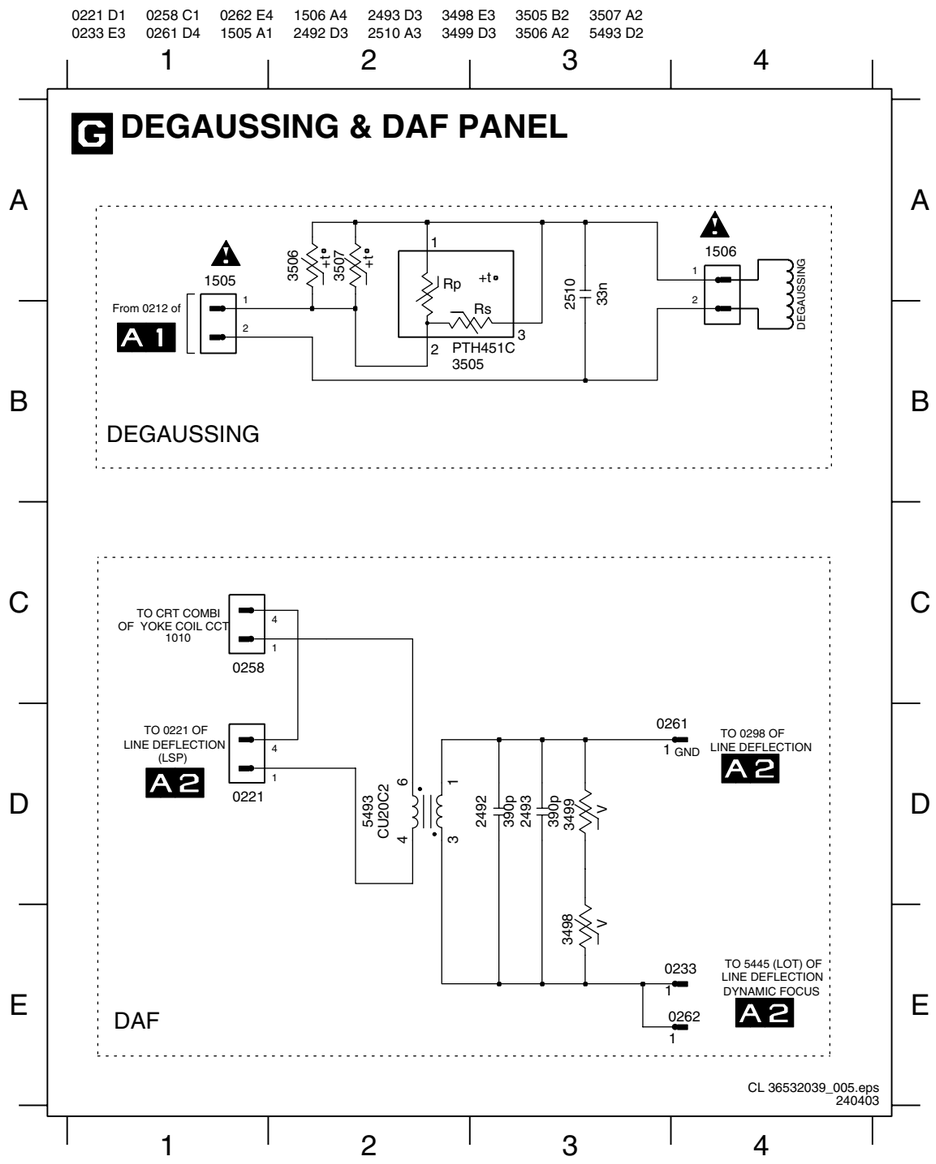
Layout Top Control Panel (Top Side)



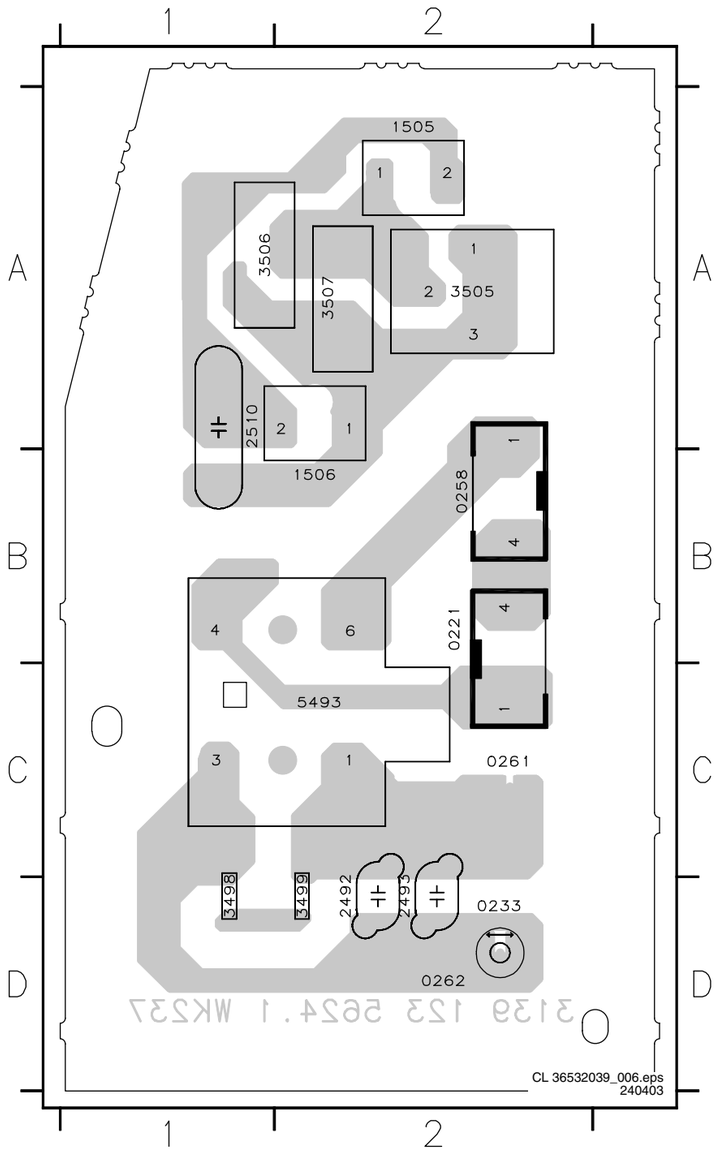
Layout Top Control Panel (Bottom Side)



Degaussing & DAF Panel

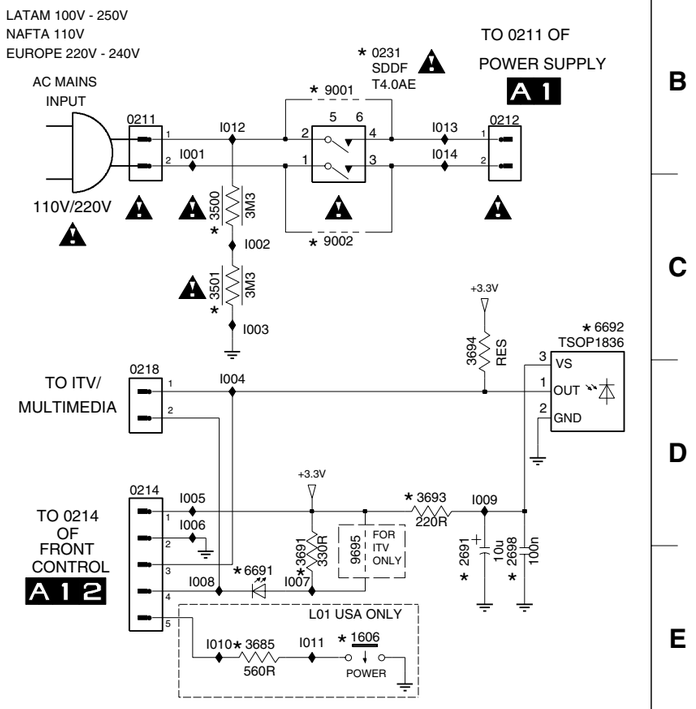


Layout Degaussing & DAF Panel (Top Side)



Front Interface Panel

Q 1 FRONT INTERFACE PANEL



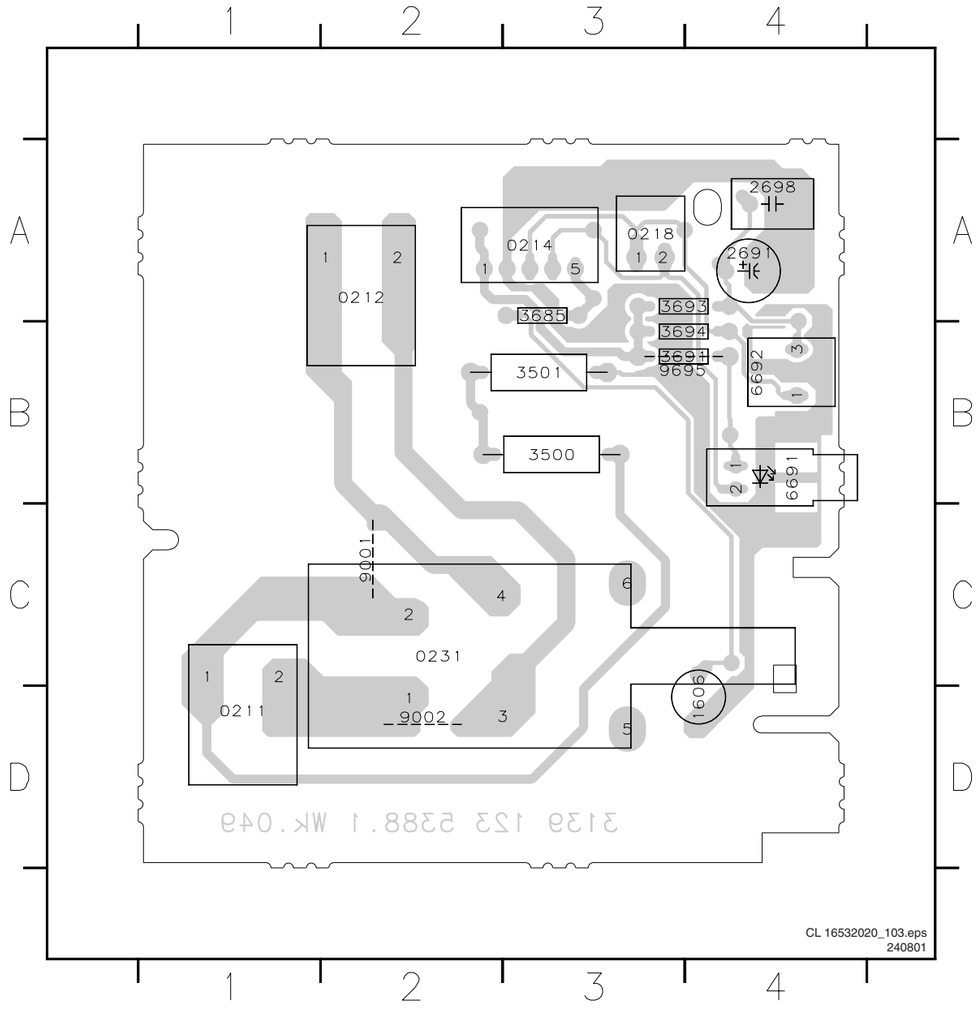
0211 B3
0212 B5
0214 D3
0218 D3
0231 B4
1606 E4
2691 E5
2698 E5
3500 C3
3501 C3
3685 E4
3691 E4
3693 D5
3694 C5
6691 E4
6692 C6
9001 B4
9002 C4
9695 E4
I001 B3
I002 C4
I003 C4
I004 D4
I005 D3
I006 D3
I007 E4
I008 E3
I009 D5
I010 E3
I011 E4
I012 B4
I013 B5
I014 B5

ITEM	KEYBOARD IR+LED-GL	KEYBOARD IR+LED-NA	IR+LED-NA	IR+LED EU/AP	FRNT.INTERF AP	TOP CTL + FR.PL INTERF - EU/NA
0231	2P 8/128A SDKV	-	-	2P 8/128A SDKV	-	-
9001	-	YES	YES	-	YES	YES
9002	-	YES	YES	-	YES	YES

ITEM	FRNT INTERF. - SLIM EU / LA	FRNT INTERF. - SLIM NA	FRNT INTERF. - SLIM EU NON ULL01L
0231	YES	---	YES
1606	---	YES	---
2691	YES	YES	---
2698	YES	YES	---
3500	YES	YES	---
3501	YES	YES	---
3685	---	YES	---
3691	YES	YES	---
3693	YES	YES	---
6691	YES	YES	---
6692	YES	YES	---
9901	---	YES	---
9002	---	YEs	---

CL 26532119_059.eps
161202

Layout Front Interface Panel



0211 C1
0212 A2
0214 A3
0218 A3
0231 C3
1606 D4
2691 A4
2698 A4
3500 B3
3501 B3
3685 A3
3691 B3
3693 A3
3694 B3
6691 B4
6692 B4
9001 C2
9002 D2
9695 B3

CL 16532020_103.eps
240801

8. Alignments

Index of this chapter:
1. General Alignment Conditions
2. Hardware Alignments
3. Software Alignments and Settings

Note: The Service Default Alignment Mode (SDAM) is described in the "Service Modes, Error Codes and Fault Finding" section. SDAM menu navigation is performed by using the MENU UP, MENU DOWN, MENU LEFT, and MENU RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:
- AC voltage and frequency: according to country's standard.
- Connect the television set to the AC power via an isolation transformer.
- Allow the television set to warm up for approximately 20 minutes.
- Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use heatsinks as ground.
- Test probe: Ri > 10 MOhm; Ci < 2.5 pF.
- Use an isolated trimmer/screwdriver to perform the alignments.

8.2 Hardware Alignments

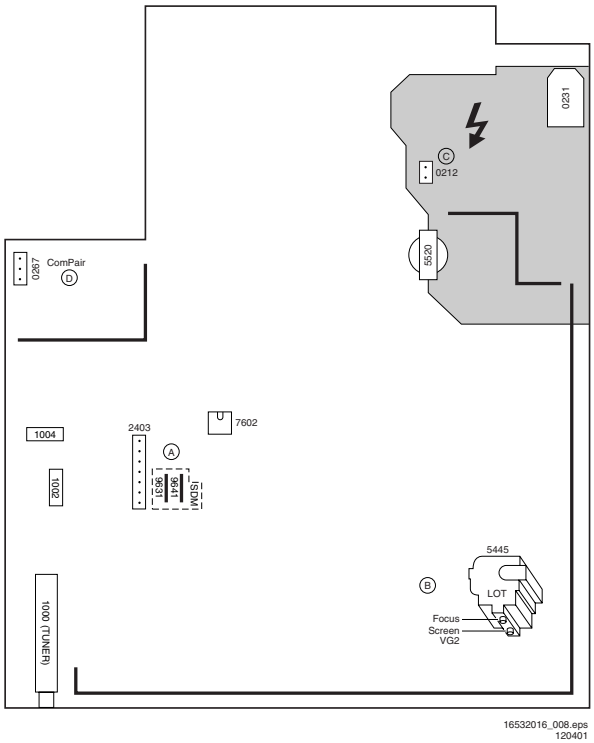


Figure 8-1 Family Board (top view)

8.2.1 Vg2 Adjustment

1. To enter SDAM, press the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the WHITE TONE sub menu.
3. Press the MENU LEFT or MENU RIGHT key to enter the WHITE TONE sub menu.
4. In the WHITE TONE sub menu, press the MENU UP/DOWN keys to select NORMAL RED, NORMAL GREEN, or NORMAL BLUE.
5. Use the MENU LEFT/RIGHT keys to set the values of NORMAL RED, NORMAL GREEN and NORMAL BLUE to '40'.
6. Press the MENU button twice to enter the normal user menu.
7. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
8. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
9. Use the MENU UP/DOWN keys to select PICTURE. Be sure to record the current value of PICTURE.
10. Use the MENU LEFT/RIGHT keys to set the value of PICTURE to '0'.
11. Use the MENU UP/DOWN keys to select BRIGHTNESS. Be sure to record the current value of BRIGHTNESS.
12. Use the MENU LEFT/RIGHT keys to set the value of BRIGHTNESS to minimum (OSD just visible in a dark room).
13. Press the MENU button twice to return to the top level SDAM menu.
14. Press the OSC/STATUS button to hide the SDAM onscreen display.
15. Connect the RF output of a video pattern generator to the antenna input.
16. Input a 'black picture' test pattern to the television set.
17. Set the oscilloscope to 50 V/div and the time base to 0.2 milliseconds (external triggering on the vertical pulse).
18. Ground the scope at the CRT panel and connect a 10:1 probe to one of the cathodes of the picture tube socket (see schematic diagram B1).
19. Measure the' cut off pulse' during the first full line after the frame blanking (see Fig. 8-2). You will see two pulses, one being the 'cut off pulse' and the other being the 'white drive pulse'. Choose the one with the lowest value; this is the 'cut off pulse'.
20. Select the cathode with the highest V_{DC} value for the alignment. Adjust the Vcutoff of this gun with the SCREEN potentiometer (see Fig. 8-1) on the LOT to the correct value (see table 'Vg2 cut-off point').
21. Press the OSC/STATUS button to display the SDAM onscreen display.
22. Press the MENU button to enter the normal user menu.
23. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
24. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
25. Use the MENU UP/DOWN keys to select PICTURE.
26. Use the MENU LEFT/RIGHT keys to reset the value of PICTURE to the original value.
27. Use the MENU UP/DOWN keys to select BRIGHTNESS.
28. Use the MENU LEFT/RIGHT keys to reset the value of BRIGHTNESS to the original value.
29. Press the MENU button twice to return to the top level SDAM menu.
30. Use the POWER button on the remote control transmitter or the POWER button on the television set to turn off the television set. This will save the changes made in SDAM.

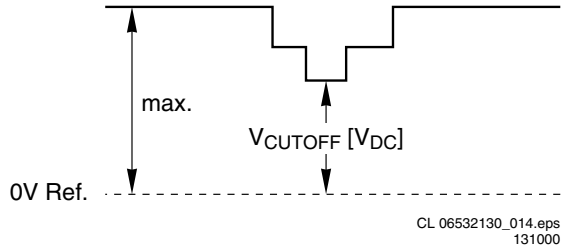


Figure 8-2 Vcutoff

Table 8-1 Vg2 cut-off point (large screen)

Screen Size	Cut-off point (V)
25/28Tesla 25/28BLD	+140 V ± 4 V
21RFMEC/ 21RF SMGK/ 21RF LG/ 25"HF LA 25RF 25/28"BLS 29RF	+145 V ± 4 V
21RF AP/CH 25" AP/CH, 25RF AP/CH 29SF AP 29RF (CH) 34SF(AP)	+155 V ± 4 V
21RF Ph/ 21RF Ph RCF/ 24WS BLD 24WSRF EU 28WS BLD 28WSRF 29RF (Eu) 32WS BLS 32WSRF	+160 V ± 4 V

8.2.2 Focusing

1. Connect the RF output of a video pattern generator to the antenna input.
2. Input a circle or crosshatch test pattern to the television set.
3. Press the SMART PICTURE button on the remote control transmitter repeatedly to choose NATURAL or MOVIES picture mode.
4. Adjust the FOCUS potentiometer (see Fig. 8-1) until the vertical lines near the left and right sides of the screen, and near the horizontal center of the screen, are at minimum width without visible haze.

8.3 Software Alignments and Settings

The following options are performed in the Service Default Alignment Mode (SDAM). SDAM is described in the 'Service Modes, Error Codes and Fault Finding' section.
The following alignments are explained:
1. OPTIONS
2. TUNER
3. WHITE TONE
4. GEOMETRY
5. AUDIO

8.3.1 Options

Options are used to control the presence or absence of certain features and hardware.

How to change an Option Byte
An Option Byte represents a number of different options. Changing these bytes directly makes it possible to set all options very quickly. All options are controlled via 8 option bytes.
Note: Each option byte controls several features of the television set; therefore, before changing option byte information, it is important to record the current option byte values. This ensures that the television features can be restored to the original settings, if necessary.

1. To enter SDAM, press the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the OPTIONS sub menu.
3. Press the MENU LEFT or MENU RIGHT key to enter the OPTIONS sub menu.
4. In the OPTIONS sub menu, press the MENU UP/DOWN keys to select 'OP 1' through 'OP 8'.
5. Use the number keys on the remote control transmitter to enter a new value for the selected option byte. The value must be entered as a three-digit value (for example, '4' would be entered as '0 0 4').
6. The selected value must be between '0' and '255'.
7. When all desired changes to the option bytes are made, press the MENU button to return to the top level SDAM menu. This will save changes to the option byte settings.
8. To ensure the option byte changes take effect: Turn the television set 'off' by using the POWER button on the remote control transmitter or the local keyboard. Disconnect the television set from AC power for at least ten seconds. Reconnect the television set to AC power. Turn the television set ON by using the POWER button on the remote control transmitter or the local keyboard.

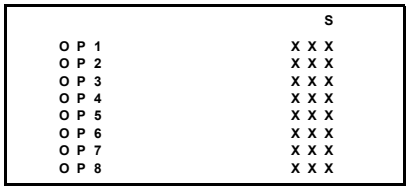


Figure 8-3 Options menu

8.3.2 Tuner

Note: Described alignments are only necessary when the NVM (part reference number 7602) is replaced.

Table 8-2 Options code setting

Typenumber	OP1	OP2	OP3	OP4	OP5	OP6	OP7	OP8
21PT1323/56R	0	23	65	0	192	144	12	4
21PT1323/67R	0	23	65	0	192	144	11	16
21PT1323/69R	0	23	65	0	192	144	11	1
21PT1323/71R	0	23	65	0	64	144	0	2
21PT1323/79R	0	23	65	0	192	144	11	1
21PT1324/93R	0	23	65	0	192	144	10	1
21PT1325/93R	1	23	65	0	192	144	10	1
21PT3123/93R	1	215	65	1	236	145	92	1
21PT3223/67R	0	215	65	1	228	145	28	16
21PT3323/56R	0	215	65	1	236	145	28	4
21PT3323/67R	0	215	65	1	236	145	28	16
21PT3323/69R	0	215	65	1	236	145	28	1
21PT3323/71R	0	215	65	33	108	145	16	2
21PT3323/79R	0	215	65	1	236	145	28	1
21PT4223/67R	0	215	65	170	236	145	92	16
21PT4223/69R	0	215	65	170	236	145	92	1
21PT4323/56R	0	215	81	170	252	145	92	4
21PT4323/67R	0	215	81	170	252	145	92	16
21PT4323/69R	0	215	81	170	252	145	92	1
21PT4323/71R	0	215	81	162	124	145	80	34
21PT4323/79R	0	215	81	170	252	145	92	1
25PT3123/93R	1	215	193	1	228	145	28	1
25PT3323/56R	0	215	193	1	236	145	28	4
25PT3323/67R	0	215	193	1	236	145	28	16
25PT3323/69R	0	215	193	1	236	145	28	1
25PT3523/93R	1	215	193	170	236	145	92	1
25PT4323/56R	0	215	209	170	236	145	92	4
25PT4323/67R	0	215	193	170	236	145	92	16
25PT4323/69R	0	215	209	170	236	145	92	1
25PT4323/71R	0	215	209	162	108	145	80	34
25PT4323/79R	0	215	209	170	236	145	92	1
29PT3123/93R	1	215	193	1	228	145	28	1
29PT3133/93R	1	215	193	1	228	145	12	1
29PT3223/56R	0	215	193	1	236	145	28	4
29PT3223/67R	0	215	193	1	236	145	28	16
29PT3223/69R	0	215	193	1	236	145	28	1
29PT3223/79R	0	215	193	1	236	145	28	1
29PT3323/56R	0	215	193	170	236	145	28	4
29PT3323/67R	0	215	193	9	236	145	28	16
29PT3323/69R	0	215	193	170	236	145	28	1
29PT3323/71R	0	215	193	162	108	145	16	34
29PT3323/79R	0	215	193	170	236	145	28	1
29PT3523/93R	1	215	193	170	252	145	92	1
29PT3533/93R	1	215	193	170	252	145	92	1
29PT4323/56R	0	215	209	170	252	145	92	4
29PT4323/67R	0	215	209	170	252	145	92	16
29PT4323/69R	0	215	209	170	252	145	92	1
29PT4323/71R	0	215	209	162	124	145	80	34
29PT4323/79R	0	223	209	170	252	145	92	1
29PT4520/93R	1	215	193	1	228	145	12	1
34PT4323/56R	0	223	209	170	252	145	92	4
34PT4323/67R	0	223	209	42	252	145	92	16
34PT4323/69R	0	223	209	170	252	145	92	1
34PT4323/71R	0	223	209	162	124	145	80	2
34PT4323/93R	1	223	209	170	252	145	92	1
34PT4523/93R	1	223	209	170	252	145	92	1

IF-PLL

This adjustment is auto-aligned. Therefore, no action is required.

AGC (AGC take over point)

1. Connect the RF output of a video pattern generator to the antenna input.
2. Input a color bar test pattern to the television set.
3. Set the amplitude of the video pattern generator to 10 mV and set the frequency to 475.25 MHz (PAL/SECAM) or 61.25 MHz (NTSC).
4. Connect a DC multimeter to pin 1 of the tuner (item 1000 on the main chassis).
5. To enter SDAM, press the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
6. Use the MENU UP/DOWN keys to highlight the TUNER sub menu.
7. Press the MENU LEFT/RIGHT keys to enter the TUNER sub menu.
8. Use the MENU UP/DOWN keys to select AGC.
9. Use the MENU LEFT/RIGHT keys to adjust the AGC value (default value is 27) until the DC-voltage at pin 1 of the tuner lies between 3.8 V and 2.3 V.
10. Press the MENU button to return to the top level SDAM menu.
11. To ensure the AGC change takes effect:
    - Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
    - Disconnect the television set from AC power for at least ten seconds.
    - Reconnect the television set to AC power.
    - Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

SL (Slicing Level)

This adjustment sets the sync slicing level for non-standard signals. You must turn it 'on' to have no picture instability in premium decoded cable channels.

- OFF: slicing level dependent on noise level.
- ON: fixed slicing level of 70 %.

To adjust SL:

1. To enter SDAM, press the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the TUNER sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the TUNER sub menu.
4. Use the MENU UP/DOWN keys to select SL.
5. Use the MENU LEFT/RIGHT keys to toggle SL 'Off' and 'On'.
6. Press the MENU button to return to the top level SDAM menu.
7. To ensure the SL setting is saved:
    - Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
    - Disconnect the television set from AC power for at least ten seconds.
    - Reconnect the television set to AC power.
    - Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

8.3.3 White Tone

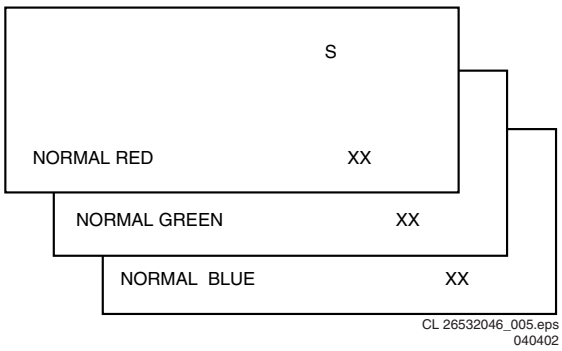


Figure 8-4 White tone alignment menu

The values of the 'black cut off level' can be adjusted in the 'WHITE TONE' sub menu.
Normally, no alignment is needed for 'WHITE TONE', and the given default values are used.

Default settings:
NORMAL (color temperature = 9600 K):
- NORMAL RED = 40
- NORMAL GREEN = 40
- NORMAL BLUE = 40

To adjust NORMAL RED, NORMAL GREEN, and NORMAL BLUE:
1. To enter SDAM, press the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the WHITE TONE sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the WHITE TONE sub menu.
4. Use the MENU UP/DOWN keys to select NORMAL RED, NORMAL GREEN, or NORMAL BLUE.
5. Use the MENU LEFT/RIGHT keys to adjust the value of NORMAL RED, NORMAL GREEN, or NORMAL BLUE.
6. When all desired changes to the WHITE TONE sub menu values are made, press the MENU button to return to the top level SDAM menu.
7. To ensure the WHITE TONE settings are saved:
   - Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
   - Disconnect the television set from AC power for at least ten seconds.
   - Reconnect the television set to AC power.
   - Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.
   - ?

8.3.4 Geometry

The geometry alignments menu contains several items for correct picture geometry alignment.

1. Connect the RF output of a video pattern generator to the antenna input.
2. Input a crosshatch test pattern to the television set.
3. Set the amplitude of the video pattern generator to at least 1 mV and set the frequency to 475.25 MHz (PAL/SECAM) or 61.25 MHz (NTSC).
4. Press the AUTO PICTURE button on the remote control transmitter repeatedly to choose PERSONAL or MOVIES picture mode.
5. To enter SDAM, press the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
6. Use the MENU UP/DOWN keys to highlight the GEOMETRY sub menu.
7. Press the MENU LEFT/RIGHT keys to enter the GEOMETRY sub menu.
8. Use the MENU UP/DOWN keys to highlight either the HORIZONTAL sub menu or the VERTICAL sub menu.
9. Press the MENU LEFT/RIGHT keys to enter either the HORIZONTAL sub menu or the VERTICAL sub menu.
10. Use the MENU UP/DOWN keys to select items in the HORIZONTAL sub menu or the VERTICAL sub menu.
11. Use the MENU LEFT/RIGHT keys to adjust the values of items in the HORIZONTAL and VERTICAL sub menus.
12. When all desired changes to the HORIZONTAL and VERTICAL sub menu values are made, press the MENU button twice to return to the top level SDAM menu.
13. To ensure the GEOMETRY settings are saved:
    - Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
    - Disconnect the television set from AC power for at least ten seconds.
    - Reconnect the television set to AC power.
    - Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

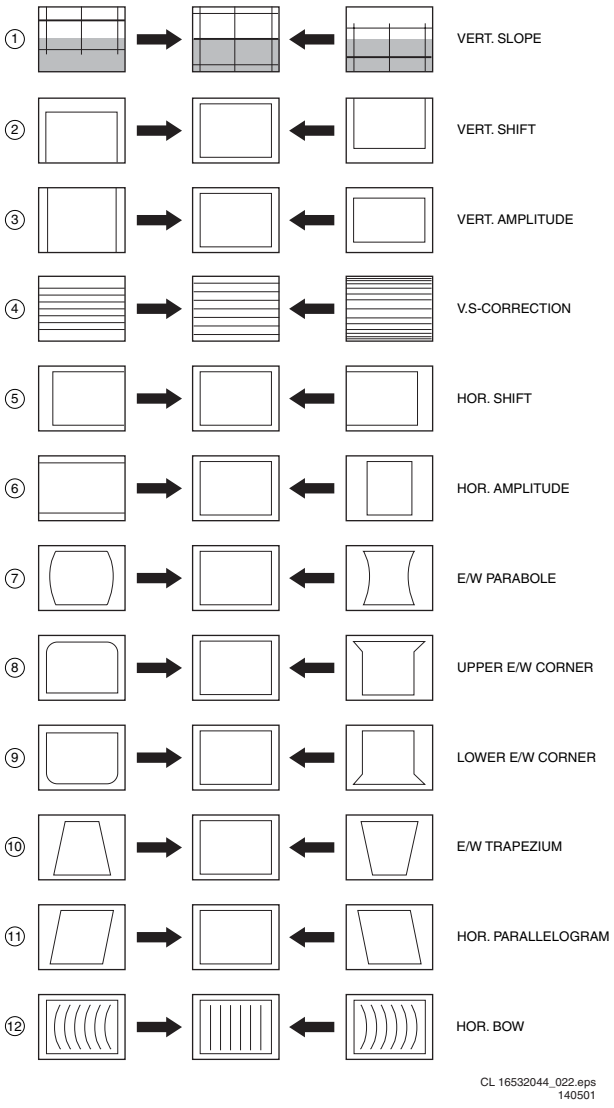


Figure 8-5 Geometry alignments

The following alignments can be performed in the GEOMETRY sub menu:

Horizontal Amplitude and Phase:

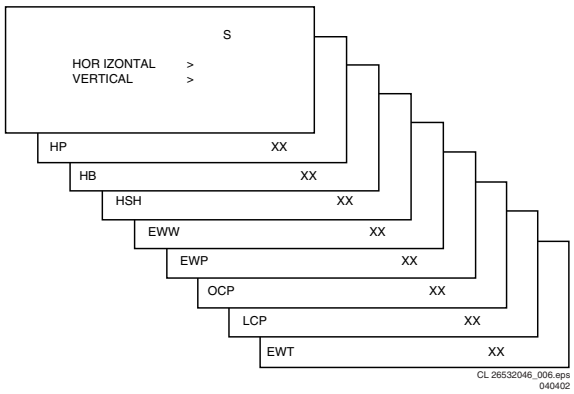


Figure 8-6 Horizontal alignment menu

- **Horizontal Shift (HSH).** Select Horizontal Shift to canter the picture on the screen.
- **Horizontal Parallelogram (HP).** Set Horizontal Parallelogram to prevent the picture from slanting to one side.
- **Horizontal Bow (HB).** Set Horizontal Bow to prevent the top and bottom of picture from bending to the sides.
- **East West Width (EWW).** Select East-West Width and align the picture width until the complete test pattern is visible.
- **East West Parabola (EWP).** Select East-West Parabola and align the vertical sides until the sides are straightened.
- **Upper Corner Parabola (UCP).** Select Upper Corner Parabola to straighten the top of the vertical lines at the sides.
- **Lower Corner Parabola (LCP).** Select Lower Corner Parabola to straighten the bottom of the vertical lines at the sides.
- **East West Trapezium (EWT).** Align straight vertical lines in the middle of the screen.

Vertical Amplitude and Position:

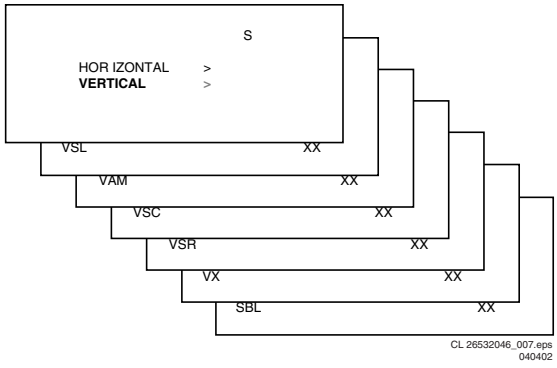


Figure 8-7 Horizontal alignment menu

- **Vertical Amplitude (VAM).** Aligns the height of the picture (other vertical alignments are NOT compensated).
- **Vertical slope (VSL).** Aligns the picture so the proportions are the same at the top and botton of the screen.This alignment must be performed first, before all other vertical alignments. Turning SBL 'on' will assist in performing this alignment.
- **Service blanking (SBL).** Turns the blanking of the lower half of the screen 'on' or 'off' (to be used in combination with the vertical slope alignment).
- **Vertical S-Correction (VSC).** Aligns the vertical linearity, so that the vertical intervals of the grid-patterns are the same over the entire height of the screen.
- **Vertical Shift (VSH).** Aligns the vertical center of the picture to the vertical center of the CRT. After performing this alignment, it may be necessary to perform the VAM alignment again.
- **Vertical Zoom (VX).** Adjusts the picture height.
- **Delta Horizontal Shift 60 Hz (H60).**
- **Delta Vertical Amplitude 60 Hz (V60).**

Methods of adjustment

1. Select Service Blanking (SBL) and set it to 1. The lower half of the picture will be blanked.
2. Press the MENU UP/DOWN buttons to select Vertical Slope (VSL).
3. Align VSL to start the blanking exactly at the horizontal white line at the canter of the test circle (align the bottom of the screen so that castellations just disappear).
4. Press the MENU UP/DOWN buttons to select SBL and set it back to 0. The full picture reappears.
5. Select Vertical Amplitude (VAM) and align the picture height to approximately 13.0 - 13.1 blocks (align the top of the screen so that castellations just disappear).
6. Select Vertical Shift (VSH) and align for vertical centering of the picture on the screen.

Repeat the last two steps if necessary.

The table below lists the default GEOMETRY values for the different television sets.

Table 8-3 Default geometry values

Parameter	20RF, 21RF, 25RF, 27RF, 29RF, 25", 28", 29"SF, 32V, 33"	25V	27V/29"	35V	28WS	32WS	28WSRF	32WSRF
HP Hor. Parallelogram	31	31	31	45	47	32	36	45
HB Hor. Bow	31	31	31	25	32	32	40	30
HSH Hor. Shift	35	35	35	23	27	24	31	29
EWW East-West Width	34	-	-	45	36	39	40	33
EWP East-West Parabola	33	-	-	23	21	21	37	16
UCP Upper Corner Parabola	35	-	-	25	26	23	14	16
LCP Lower Corner Parabola	35	-	-	31	30	30	25	23
EWT East-West Trapezium	35	-	-	24	28	26	18	27
VSL Vertical Slope	33	25	25	19	42	35	31	25
VAM Vertical Amplitude	26	32	32	31	30	23	23	30
VSC Vertical S-Correction	23	23	23	27	24	24	12	20
VSH Vertical Shift	31	28	28	26	18	23	36	34

Parameter	20RF, 21RF, 25RF, 27RF, 29RF, 25", 28", 29"SF, 32V, 33"	25V	27V/29"	35V	28WS	32WS	28WSRF	32WSRF
VX Vertical Zoom	25	-	-	25	25	25	25	25
H60 Horizontal Shift Offset (NTSC)	9	9	9	9	9	9	9	9
V60 Vertical Shift Offset (NTSC)	-2	-2	-2	-2	-2	-2	-2	-2

8.3.5 Audio

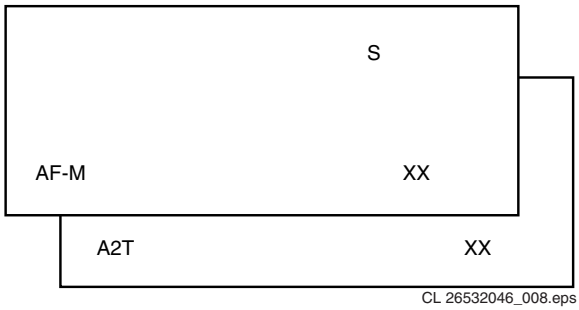


Figure 8-8 Audio alignment menu

No alignments are necessary for the AUDIO sub menu. Use the default values.

AF-M (NICAM threshold)
Default value is 300.

To adjust AF-M:
1. To enter SDAM, press the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the AUDIO sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the AUDIO sub menu.
4. Use the MENU UP/DOWN keys to select AF-M.
5. Use the MENU LEFT/RIGHT keys to adjust the value of AF-M to 300.
6. Press the MENU button to return to the top level SDAM menu.
7. To ensure the AF-M setting is saved:
   – Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
   – Disconnect the television set from AC power for at least ten seconds.
   – Reconnect the television set to AC power.
   – Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

A2T (TV A2 Threshold)
Default value is 250.

To adjust A2T:
1. To enter SDAM, press the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the AUDIO sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the AUDIO sub menu.
4. Use the MENU UP/DOWN keys to select A2T.
5. Use the MENU LEFT/RIGHT keys to adjust the value of A2T to 250.
6. Press the MENU button to return to the top level SDAM menu.
7. To ensure the A2T setting is saved:
   – Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
   – Disconnect the television set from AC power for at least ten seconds.
   – Reconnect the television set to AC power.
   – Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard

9. Circuit Description

Index of this chapter:
1. Introduction
2. Audio Signal Processing
3. Video Signal Processing
4. Synchronization
5. Deflection
6. Power Supply
7. Control
8. Abbreviations
9. IC Data Sheets

Notes:
- For a good understanding of the following circuit descriptions, please use the block diagram in section 'Wiring Diagram, Block Diagrams, and Overviews' and/or the electrical diagrams in section 'Circuit Diagrams and PWB Layouts'. Where necessary, you will find a separate drawing for clarification.
- Figures below can deviate slightly from the actual situation, due to different set executions.

9.1 Introduction

The 'L01.1A AC' chassis is a global TV chassis for the model year 2003 and is used for TV sets with screen sizes from 20" to 36", in Super Flat, Real Flat, and Wide Screen executions. In comparison to its predecessor (the 'L01.1A AB'), the chassis has enhanced features like 'Virtual Dolby', and 'Active Control', presented in a new 'Smartline' styling.

The standard architecture consists of a Main panel, a Picture Tube panel, a Side I/O panel, and a Top Control panel.
The Main panel consists primarily of conventional components with hardly any surface mounted devices.

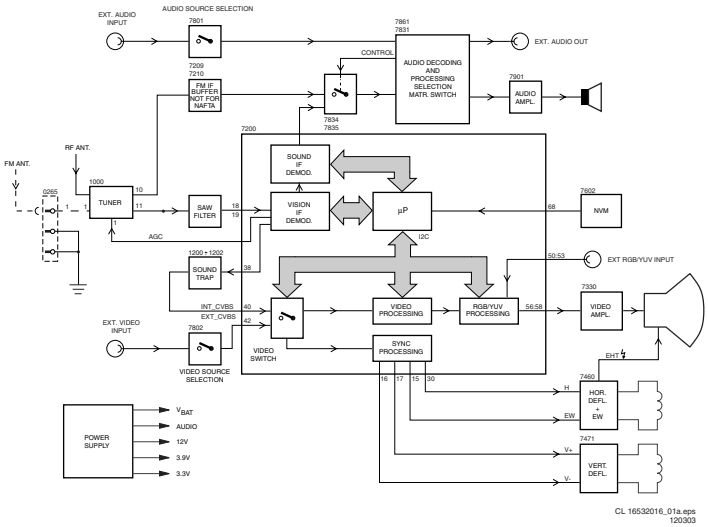


Figure 9-1 Block diagram

The functions for video processing, microprocessor (P), and teletext (TXT) decoder are combined in one IC (TDA958xH), the so-called Ultimate One Chip (UOC). This chip is (surface) mounted on the copper side of the LSP.

The 'L01.1L AC' is divided into 2 basic audio systems, i.e. mono and stereo sound. While the audio processing for the mono sound is done in the audio block of the UOC, an external audio processing IC is used for stereo sets.

The tuning system features 181 channels with on-screen display. The main tuning system uses a tuner, a microcomputer, and a memory IC mounted on the main panel. The microcomputer communicates with the memory IC, the customer keyboard, remote receiver, tuner, signal processor IC and the audio output IC via the I2C bus. The memory IC retains the settings for favorite stations, customer-preferred settings, and service / factory data.
The on-screen graphics, teletext and closed caption decoding are done within the microprocessor, and then sent to the signal processor IC to be added to the main signal.

The chassis utilizes a Switching Mode Power Supply (SMPS) for the main voltage source. The chassis has a 'hot' ground reference on the primary side and a cold ground reference on the secondary side of the power supply and the rest of the chassis.

9.2 Audio Signal Processing

9.2.1 Stereo

In stereo sets, the signal goes via the SAW filter (position 1002/ 1003), to the audio demodulator part of the UOC IC 7200. The audio output on pin 33 goes to the stereo decoder 7831/ 7861. The switch inside this IC selects either the internal decoder or an external source (see also block diagram above).

The built-in stereo decoder item 7831 (MSP34X5) can receive 2CS, NICAM and BTSC stereo signals.

The output is fed to the to the audio amplifier (AN7522 at position 7901). The volume level is controlled at this IC (pin 9) by a 'Volume|Mute' control line from the microprocessor. The audio signal from 7901 is then send to the speaker and headphone output panel.

9.2.2 Mono

In mono sets, the signal goes via the SAW filter (position 1002/ 1003), to the audio demodulator part of the UOC IC 7200. The audio output on pin 48 goes to the audio amplifier (AN7523 at position 7902).
The volume level is controlled at this IC (pin 9) by a 'Volume|Mute' control line from the microprocessor.
The audio signal from IC 7902 is then send to the speaker and headphone output panel.

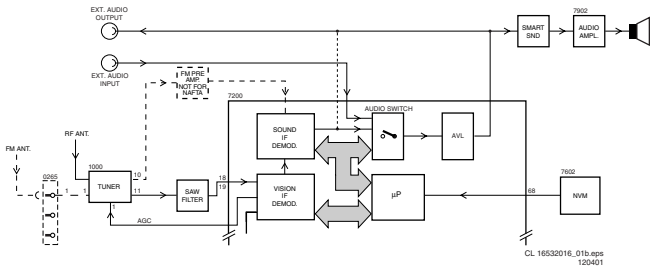


Figure 9-2 Mono audio signal processing

9.3 Video Signal Processing

9.3.1 Introduction

The video signal-processing path consists of the following parts:

- RF signal processing.
- Video source selection.
- Video demodulation.
- Luminance / Chrominance signal processing.
- RGB control.
- RGB amplifier

The processing circuits listed above are all integrated in the UOC TV processor. The surrounding components are for the adaptation of the selected application. The I2C bus is for defining and controlling the signals.

9.3.2 RF Signal Processing

The incoming RF signal goes to the tuner (pos. 1000), where the IF signal is developed and amplified. The IF signals then exits the tuner from pin 11 to pass through the SAW filter (pos. 1002/1003). The shaped signal is then applied to the IF processor part of the UOC (pos. 7200).
Tuner AGC (Automatic Gain Control) will reduce the tuner gain and thus the tuner output voltage when receiving strong RF signals. Adjust the AGC takeover point via the Service Default Alignment Mode (SDAM). The tuner AGC starts working when the video-IF input reaches a certain input level and will adjust this level via the I2C bus. The tuner AGC signal goes to the tuner (pin 1) via the open collector output (pin 22) of the UOC. The IC also generates an Automatic Frequency Control (AFC) signal that goes to the tuning system via the I2C bus, to provide frequency correction when needed.
The demodulated composite video signal is available at pin 38 and then buffered by transistor 7201.

9.3.3 Video Source Selection

The Composite Video Blanking Signal (CVBS) from buffer 7201 goes to the audio carrier trap filters 1200, 1201, or 1202 (depending on the system used), to remove the audio signal. The signal then goes to pin 40 of IC 7200. The internal input switch selects the following input signals:

- Pin 40: terrestrial CVBS input
- Pin 42: external AV1 CVBS input
- Pin 44: external Side I/O CVBS or Y input
- Pin 45: external AV2 or chrominance C input

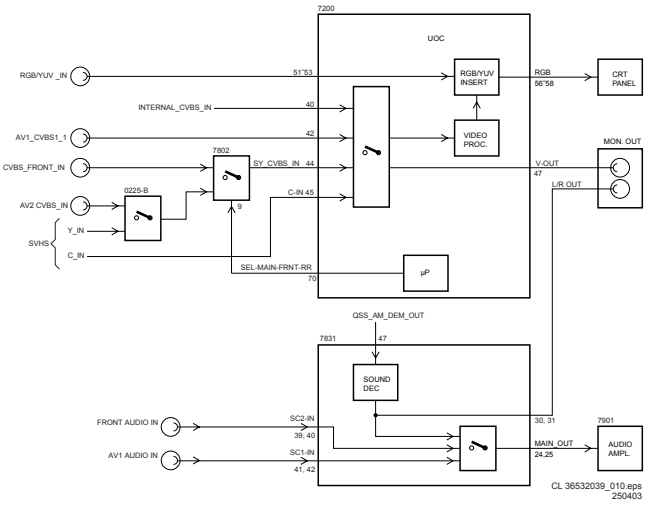


Figure 9-3 Video source selection

Once the signal source is selected, a chroma filter calibration is performed. The received color burst sub-carrier frequency is used for this. Correspondingly, the chroma band pass filter for PAL/NTSC processing or the cloche filter for SECAM processing is switched on. The selected luminance (Y) signal is supplied to the horizontal and vertical synchronization circuit and to the luminance processing circuit. In the luminance-processing block, the luminance signal goes to the chroma trap filter. This trap is switched 'on' or 'off' depending on the color burst detection of the chroma calibration circuit.
The group delay correction part can be switched between the BG and a flat group delay characteristic. This has the advantage that in multi-standard receivers no compromise has to be made for the choice of the SAW filter.

9.3.4 Video Demodulation

The color decoder circuit detects whether the signal is a PAL, NTSC, or SECAM signal. The result is made known to the auto system manager. The PAL/NTSC decoder has an internal clock generator, which is stabilized to the required frequency by using the 12 MHz clock signal from the reference oscillator of the microcontroller / teletext decoder.
The base-band delay line is used to obtain a good suppression of cross color effects.
The Y signal and the delay line outputs U and V are applied to the luminance / chroma signal processing part of the TV processor.

9.3.5 Luminance / Chrominance signal Processing

The output of the YUV separator is fed to the internal YUV switch, which switches between the output of the YUV separator or the external YUV (for DVD or PIP) on pins 51-53. Pin 50 is the input for the insertion control signal called 'FBL-1'. When this signal level becomes higher than 0.9 V (but less than 3 V), the RGB signals at pins 51, 52, and 53 are inserted into the picture by using the internal switches.
Also, some picture improvement features are implemented in this part:

- **Black stretch.** This function corrects the black level of incoming signals, which have a difference between the black level and the blanking level. The amount of extension depends upon the difference between actual black level and the darkest part of the incoming video signal level. It is detected by means of an internal capacitor.
- **White stretch.** This function adapts the transfer characteristic of the luminance amplifier in a non-linear way depending on the average picture content of the luminance signal. It operates in such a way that maximum stretching is obtained when signals with a low video level are received. For bright pictures, stretching is not active.
- **Dynamic skin tone correction.** This circuit corrects (instantaneously and locally) the hue of those colors, which are located in the area in the UV plane that matches the skin tone. The correction is dependent on the luminance, saturation, and distance to the preferred axis.

The YUV signal is then fed to the color matrix circuit, which converts it to R, G, and B signals.
The OSD/TXT signal from the microprocessor is mixed with the main signal at this point, before being output to the CRT board (pins 56, 57, and 58).

9.3.6 RGB Control

The RGB control circuit enables the picture parameters contrast, brightness, and saturation to be adjusted, by using a combination of the user menus and the remote control. Additionally automatic gain control for the RGB signals via cut-off stabilization is achieved in this functional block to obtain an accurate biasing of the picture tube. Therefore, this block inserts the cut-off point measuring pulses into the RGB signals during the vertical retrace period.

The following additional controls are used:

- **Black current calibration loop.** Because of the 2-point black current stabilization circuit, both the black level and the amplitude of the RGB output signals depend on the drive characteristics of the picture tube. The system checks whether the returning measuring currents meet the requirements, and adapt the output level and gain of the circuit when necessary. After stabilization of the loop, the RGB drive signals are switched on. The 2-point black level system adapts the drive voltage for each cathode in such a way that the two measuring currents have the right value. This is done with the measurement pulses during the frame flyback. During the first frame, three pulses with a current of 8 µA are generated to adjust the cut off voltage. During the second frame, three pulses with a current of 20 µA are generated to adjust the 'white drive'. This has as a consequence, that a change in the gain of the output stage will be compensated by a gain change of the RGB control circuit. Pin 55 (BLKIN) of the UOC is used as the feedback input from the CRT base panel.
- **Blue stretch.** This function increases the color temperature of the bright scenes (amplitudes which exceed a value of 80% of the nominal amplitude). This effect is obtained by decreasing the small signal gain of the red and green channel signals, which exceed this 80% level.
- **Beam current limiting.** A beam current limiting circuit inside the UOC handles the contrast and brightness control for the RGB signals. This prevents the CRT from being overdriven, which could otherwise cause serious damage in the line output stage. The reference used for this purpose is the DC voltage on pin 54 (BLCIN) of the TV processor. Contrast and brightness reduction of the RGB output signals is therefore proportional to the voltage present on this pin. Contrast reduction starts when the voltage on pin 54 is lower than 2.8 V. Brightness reduction starts when the voltage on pin 54 is less than 1.7 V. The voltage on pin 54 is normally 3.3 V (limiter not active). During set switch-off, the black current control circuit generates a fixed beam current of 1 mA. This current ensures that the picture tube capacitance is discharged. During the switch-off period, the vertical deflection is placed in an over-scan position, so that the discharge is not visible on the screen.

9.3.7 RGB Amplifier

From outputs 56, 57, and 58 of IC 7200 the RGB signals are applied to the integrated output amplifier (7330) on the CRT panel. Via the outputs 7, 8, and 9, the picture tube cathodes are driven.
The supply voltage for the amplifier is +200 V and is derived from the line output stage.

9.3.8 Eco Scavem (diagram B2 if present)

The SCAn VElocity Modulation (Scavem) circuitry is implemented in the layout of the picture tube panel. It is thus not an extra module. This circuit influences the horizontal deflection as a function of the picture content. In an ideal square wave, the sides are limited in slope due to a limited bandwidth (5 MHz). Scavem will improve the slope as follows:

- **At a positive slope**, a Scavem current is generated which supports the deflection current. At the first half of the slope, the spot is accelerated and the picture is darker. At the second half of the slope, the spot is delayed and the slope becomes steeper.
- **At the end of the slope**, the Scavem-current decays to zero and the spot is at the original position. An overshoot occurs which improves the impression of sharpness.
- **At the negative slope**, the Scavem-current counteracts the deflection. During the first half of the slope, the spot is delayed and the slope becomes steeper. During the second half the spot accelerates, the Scavem-current is zero at the end of the slope.

The RGB signals are fed into the Scavem circuit and differentiated by C2364/2365/2366 and the input impedance of the TS7360 stage. Diode D6364 (Schottky diode) is the coring component, which blocks all the signals below 0.3 V so that the noise is not amplified and all the signals larger than 0.3 V are differentiated and amplified.
After differentiation, the signal is amplified by TS7360 with R3369 as the collector resistor. The biasing of the TS7360 stage is done by R3369, R3361, R3360, R3362, and R3363.

Items D6367, C2367, R3367, R3361, and C2360 work as the clipping components that limit the Scavem current at a certain level, to prevent Scavem over-correction.
After being buffered by TS7369, the differentiated signals are coupled through C2375 and C2380 to the output stage. The output stage is configured into cascode stage and push-pull operation. The biasing is done by R3373, R3375, R3376, R3380, R3381, R3383, R3374, and R3384. The working voltage of the transistors is settled at half the supply voltage. At the rising portion of the RGB signals, cascode TS7380 and TS7382 will be operating and will pull the current through the Scavem coil. Contrarily, at the falling portion of the RGB signals, cascode TS7373 and TS7366 will be operating and will push the current through the Scavem coil.

The capacitors C2362, C2373, and C2381 ground the high frequencies, to prevent high frequency amplification. The ferrite bead L5376 is for EMC purpose. Resistors R3374 and R3384 determine the output Scavem current.
Items C2378 and R3378 are for the fine-tuning for different Scavem coil impedances. They also help to suppress high frequency oscillation. Capacitor C2369 helps to suppress the high frequency components and controls the Scavem delay.

9.4 Synchronization

Inside IC 7200 part D, the vertical and horizontal sync pulses are separated. These 'H' and 'V' signals are synchronized with the incoming CVBS signal. They are then fed to the H- and V-drive circuits and to the OSD/TXT circuit for synchronization of the On Screen Display and Teletext (CC) information.

9.5 Deflection

Please use the diagrams in chapter 6 and/or 7 for elucidation of the descriptions below.

9.5.1 Horizontal Drive

The horizontal drive signal is obtained from an internal VCO, which is running at twice the line frequency. This frequency is divided by two, to lock the first control loop to the incoming signal.
When the IC is switched 'on', the 'Hdrive' signal is suppressed until the frequency is correct.
The 'Hdrive' signal is available at pin 30. The 'Hflybk' signal is fed to pin 31 to phase lock the horizontal oscillator, so that TS7462 cannot switch 'on' during the flyback time.
The 'EWdrive' signal for the E/W circuit (if present) is available on pin 15, where it drives transistor TS7400 to make linearity corrections in the horizontal drive.

When the set is switched on, the '+8V' voltage goes to pin 9 of IC7200. The horizontal drive starts up in a soft start mode. It starts with a very short T_on time of the horizontal output transistor. The T_off of the transistor is identical to the time in normal operation. The starting frequency during switch on is therefore about 2 times higher than the normal value. The 'on' time is slowly increased to the nominal value in 1175 ms. When

the nominal value is reached, the PLL is closed in such a way that only very small phase corrections are necessary.

The 'EHTinformation' line on pin 11 is intended to be used as a 'X-ray' protection. When this protection is activated (when the voltage exceeds 6 V), the horizontal drive (pin 30) is switched 'off' immediately. If the 'H-drive' is stopped, pin 11 will become low again. Now the horizontal drive is again switched on via the slow start procedure.
The 'EHTinformation' line (Aquadag) is also fed back to the UOC IC 7200 pin 54, to adjust the picture level in order to compensate for changes in the beam current.

The filament voltage is monitored for 'no' or 'excessive' voltage. This voltage is rectified by diode 6447 and fed to the emitter of transistor 7443. If this voltage goes above 6.8 V, transistor 7443 will conduct, making the 'EHT0' line 'high'. This will immediately switch off the horizontal drive (pin 30) via the slow stop procedure.

The horizontal drive signal exits IC7200 at pin 30 and goes to TS7462, the horizontal driver transistor. The signal is amplified and coupled to the base circuit of TS7460, the horizontal output transistor. This will drive the line output transformer (LOT) L5445 and the associated circuit. The LOT provides the extra high voltage (EHT), the VG2 voltage and the focus and filament voltages for the CRT, while the line output circuit drives the horizontal deflection coil.

9.5.2 Vertical Drive

A divider circuit performs the vertical synchronization. The vertical ramp generator needs an external resistor (R3245, pin 20) and capacitor (C2244, pin 21). A differential output is available at pins 16 and 17, which are DC-coupled with the vertical output stage.
During the insertion of RGB signals, the maximum vertical frequency is increased to 72 Hz so that the circuit can also synchronize on signals with a higher vertical frequency like VGA.
To avoid damage of the picture tube when the vertical deflection fails, the guard output is fed to the beam current limiting input. When a failure is detected, the RGB-outputs are blanked. When no vertical deflection output stage is connected, this guard circuit will also blank the output signals.

These 'V_DRIVE+' and 'V_DRIVE-' signals are applied to the input pins 1 and 2 of IC 7471 (full bridge vertical deflection amplifier). These are voltage driven differential inputs. As the driver device (IC 7200) delivers output currents, R3474 and R3475 convert them to voltage. The differential input voltage is compared with the voltage across measuring resistor R3471 that provides internal feedback information. The voltage across this measuring resistor is proportional to the output current, which is available at pins 4 and 7 where they drive the vertical deflection coil (connector 0222) in phase opposition.
IC 7471 is supplied by +13 V. The vertical flyback voltage is determined by an external supply voltage at pin 6 (VlotAux+50V). This voltage is almost totally available as flyback voltage across the coil, this being possible due to the absence of a coupling capacitor (which is not necessary, due to the 'bridge' configuration).

9.5.3 Deflection Corrections (see diagram A2)

The Linearity Correction
A constant voltage on the horizontal (or line) deflection coil should result in a sawtooth current. This however is not the case as the resistance of the coil is not negligible. In order to compensate for this resistance, a pre-magnetized coil L5457 is used. R3485 and C2459 ensure that L5457 does not excite, because of its own parasite capacitance. This L5457 is called the 'linearity coil'.

The Mannheim Effect
When clear white lines are displayed, the high-voltage circuit is heavily loaded. During the first half of the flyback, the high voltage capacitors are considerable charged. At that point in time, the deflection coil excites through C2465. This current peak, through the high-voltage capacitor, distorts the flyback pulse. This causes synchronization errors, causing an oscillation under the white line.
During the second half of the flyback, C2490//2458 is charged via R3459. At the moment of the flyback, C2490//2458 is subjected to the negative voltage pulses of the parabola because of which D6465 and D6466 are conducting and C2490//2458 is switched in parallel with C2456//2457. The high-voltage diodes are conducting this moment. Now extra energy is available for excitation through C2465 and the line deflection. Consequently, the flyback pulse is less distorted.

The S-Correction
Since the sides of the picture are further away from the point of deflection than from the center, a linear sawtooth current would result in a non-linear image being scanned (the center would be scanned slower than the sides). For the center-horizontal line, the difference in relation of the distances is larger then those for the top and bottom lines. An S-shaped current will have to be superimposed onto the sawtooth current. This correction is called finger-length correction or S-correction.

C2456//2457 is relatively small, as a result of which the sawtooth current will generate a parabolic voltage with negative voltage peaks. Left and right, the voltage across the deflection coil decreases, and the deflection will slow down; in the center, the voltage increases and deflection is faster. The larger the picture width, the higher the deflection current through C2456//2457. The current also results in a parabolic voltage across C2484//2469, resulting in the finger length correction proportionally increasing with the picture width. The east/west drive signal will ensure the largest picture width in the center of the frame. Here the largest correction is applied.

East/West Correction
In this chassis, there are three types of CRTs, namely the 100 deg., 110 deg., and wide screen CRTs. The 100 deg. CRT is raster-correction-free and does not need East/West correction. The 110 deg. 4:3 CRT comes with East/West correction and East/West protection.
The wide screen TV sets have all the corrections of the 110 deg. 4:3 CRT, but also have additional picture formats like the 4:3 format, 16:9, 14:9, 16:9 zoom, subtitle zoom and the Super-Wide picture format

A line, written at the upper- or lower side of the screen, will be larger at the screen center when a fixed deflection current is used. Therefore, the amplitude of the deflection current must be increased when the spot approaches the center of the screen. This is called the East/West or pincushion correction.

The 'Ewdrive' signal from pin 15 of IC 7200 takes care for the correct correction. It drives FET 7400. It also corrects breathing of the picture, due to beam current variations (the EHT varies dependent of the beam current). This correction is derived from the 'EHTinformation' line.
Two protections are built-in for the E/W circuit: over-current and over-voltage protection. See paragraph 'Protection Events'.

Panorama
The panorama function is only used in 16:9 sets. This is a function to enable the 4:3 and Super-Wide feature. It drives the 'Bass_panorama' line, to activate relay 1400. When this relay is switched on, the capacitors 2453 and 2454 are added in parallel to the default S-correction capacitors 2456 and 2457. This results in an increased capacitance, a lower resonance frequency of the line deflection coil and the S-correction capacitors and therefore a less steep S-corrected line deflection current.

9.6 Power Supply

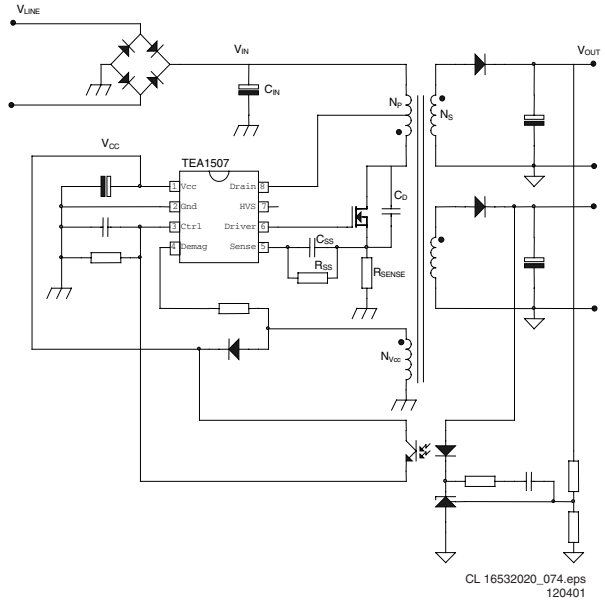


Figure 9-4 Switched Mode Power Supply standard circuit

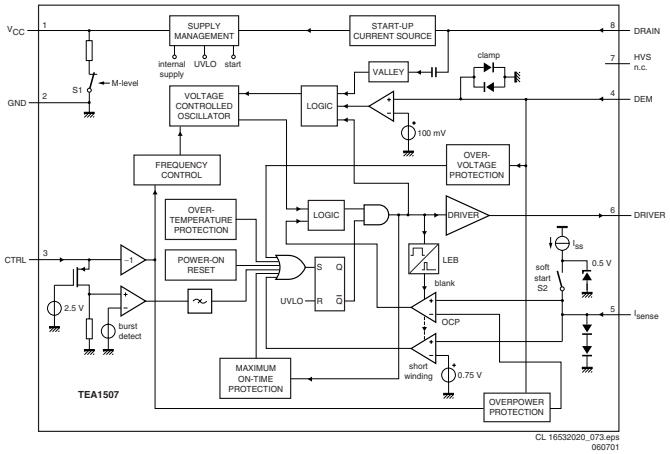


Figure 9-5 Internal block diagram of the driver IC (TEA1507)

9.6.1 Introduction

The supply is a Switching Mode Power Supply (SMPS). The frequency of operation varies with the circuit load. This 'Quasi-Resonant Flyback' behavior has some important benefits compared to a 'hard switching' fixed frequency Flyback converter. The efficiency can be improved up to 90%, which results in lower power consumption. Moreover, the supply runs cooler and safety is enhanced.

The power supply starts operating when a DC voltage goes from the rectifier bridge via T5520, R3532 to pin 8. The operating voltage for the driver circuit is also taken from the 'hot' side of this transformer.

The switching regulator IC 7520 starts switching the FET 'on' and 'off', to control the current flow through the primary winding of transformer 5520. The energy stored in the primary winding during the 'on' time is delivered to the secondary windings during the 'off' time.

The 'MainSupply' line is the reference voltage for the power supply. It is sampled by resistors 3543 and 3544 and fed to the input of the regulator 7540 / 6540. This regulator drives the feedback optocoupler 7515 to set the feedback control voltage on pin 3 of 7520.

The power supply in the set is 'on' any time AC power goes to the set.

Derived Voltages

The voltages supplied by the secondary windings of T5520 are:

- 'MainAux' for the audio circuit (voltage depends on set execution, see table below),
- 3.3 V and 3.9 V for the microprocessor and
- 'MainSupply' for the horizontal output (voltage depends on set execution, see table below).

Other supply voltages are provided by the LOT. It supplies +50 V (only for large screen sets), +13 V, +8 V, +5 V, and a +200 V source for the video drive. The secondary voltages of the LOT are monitored by the 'EHTinformation' lines. These lines are fed to the video processor part of the UOC IC 7200 on pins 11 and 34.

This circuit will shut 'off' the horizontal drive in case of over-voltage or excessive beam current.

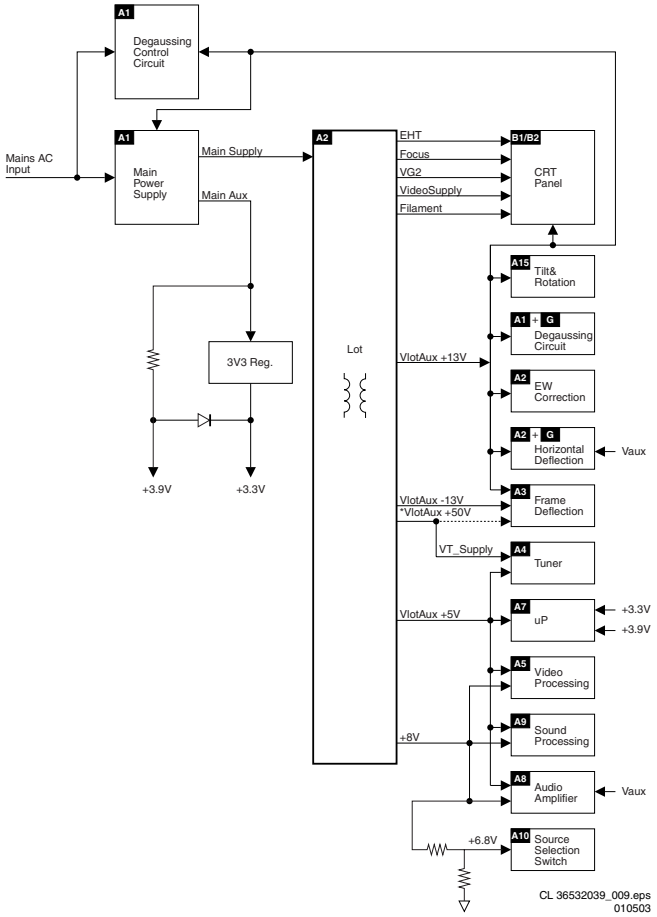


Figure 9-6 Derived voltages

Degaussing

When the set is switched on, the degaussing relay 1515 is immediately activated as transistor 7580 is conducting. Due to the RC-time of R3580 and C2580, it will last about 3 to 4 seconds before transistor 7580 is switched off.

9.6.2 Basic IC Functionality

For a clear understanding of the Quasi-Resonant behavior, it is possible to explain it by a simplified circuit diagram (see Figure below). In this circuit diagram, the secondary side is transferred to the primary side and the transformer is replaced by an inductance L_p. Capacitor C_d is the total drain capacitance including the resonance capacitor C_r, parasitic output capacitor C_oss of the MOSFET and the winding capacitance C_w of the transformer. The turn ratio of the transformer is represented by n (N_p/N_s).

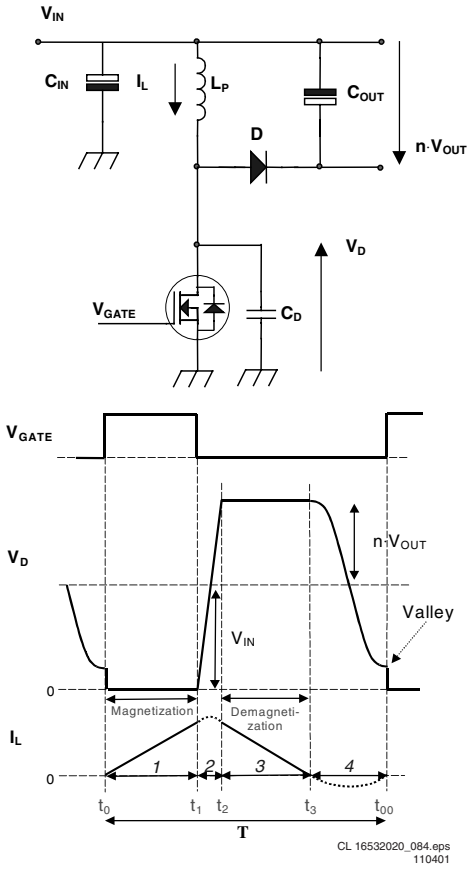


Figure 9-7 QR-mode time intervals

In the Quasi-Resonant mode each period can be divided into four different time intervals, in chronological order:

- **Interval 1: t0 < t < t1 primary stroke.** At the beginning of the first interval, the MOSFET is switched 'on' and energy is stored in the primary inductance (magnetization). At the end, the MOSFET is switched 'off' and the second interval starts.
- **Interval 2: t1 < t < t2 commutation time.** In the second interval, the drain voltage will rise from almost zero to V_in+n•(V_out+V_f). V_f is the forward voltage drop of de diode that will be omitted from the equations from now on. The current will change its positive derivative, corresponding to V_in/L_p, to a negative derivative, corresponding to -n•(V_out/L_p).
- **Interval 3: t2 < t < t3 secondary stroke.** In the third interval, the stored energy is transferred to the output, so the diode starts to conduct and the inductive current Il will decrease. In other words, the transformer will be demagnetized. When the inductive current has become zero the next interval begins.
- **Interval 4: t3 < t < t00 resonance time.** In the fourth interval, the energy stored in the drain capacitor C_d will start to resonate with the inductance L_p. The voltage and current waveforms are sinusoidal waveforms. The drain voltage will drop from V_in+(n•V_out) to V_in-(n•V_out).

Frequency Behavior

The frequency in the QR-mode is determined by the power stage and is not influenced by the controller (important parameters are L_p and C_d). The frequency varies with the input voltage V_in and the output power P_out. If the required output power increases, more energy has to be stored in the transformer. This leads to longer magnetizing t_prim and demagnetizing t_sec times, which will decrease the frequency. See the frequency versus output power characteristics below. The frequency characteristic is not only output power-, but also input voltage dependent. The higher the input voltage, the smaller t_prim, so the higher the frequency will be.

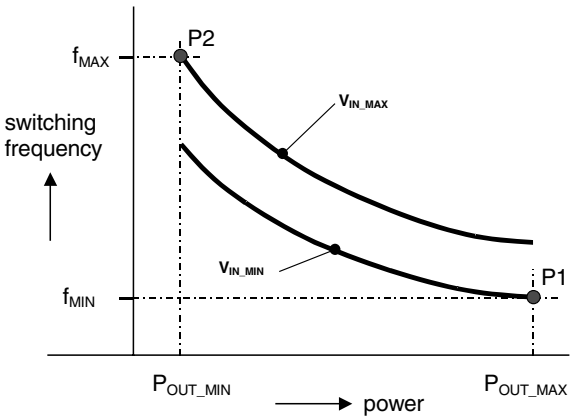


Figure 9-8 QR frequency behavior

Point P1 is the minimum frequency f_min that occurs at the specified minimum input voltage and maximum output power required by the application. Of course, the minimum frequency has to be chosen above the audible limit (>20 kHz).

Start-Up Sequence

When the rectified AC voltage V_in (via the center tap connected to pin 8) reaches the Mains dependent operation level (Mlevel: between 60 and 100 V), the internal 'Mlevel switch' will be opened and the start-up current source is enabled to charge capacitor C2521 at the V_cc pin as shown below.

The 'soft start' switch is closed when the V_cc reaches a level of 7 V and the 'soft start' capacitor C_ss (C2522, between pin 5 and the sense resistor R3526), is charged to 0.5 V.

Once the V_cc capacitor is charged to the start-up voltage V_start (11 V), the IC starts driving the MOSFET. Both internal current sources are switched 'off' after reaching this start-up voltage. Resistor R_ss (3524) will discharge the 'soft start' capacitor, such that the peak current will slowly increase. This to prevent 'transformer rattle'.

During start-up, the V_cc capacitor will be discharged until the moment that the primary auxiliary winding takes over this voltage.

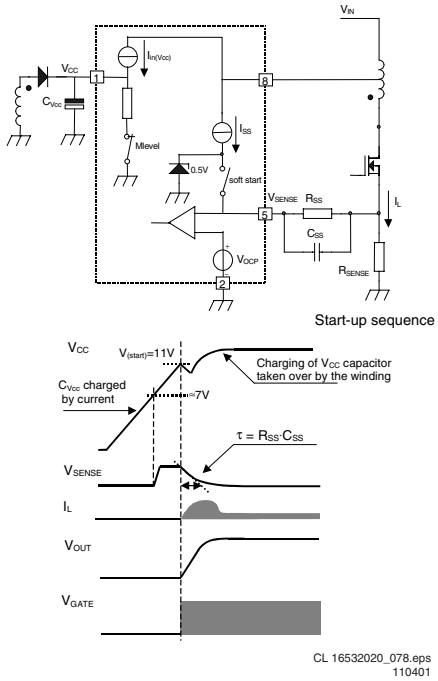


Figure 9-9 Start-up behavior

The moment that the voltage on pin 1 drops below the 'under voltage lock out' level (UVLO = ± 9 V), the IC will stop switching and will enter a safe restart from the rectified mains voltage.

Operation

The supply can run in three different modes depending on the output power:

- **Quasi-Resonant mode (QR).** The 'QR' mode, described above, is used during normal operation. This will give a high efficiency.
- **Frequency Reduction mode (FR).** The 'FR' mode (also called 'VCO' mode) is implemented to decrease the switching losses at low output loads. In this way, the efficiency at low output powers is increased, which enables power consumption smaller than 3 W during stand-by. The voltage at the pin 3 (Ctrl) determines where the frequency reduction starts. An external Ctrl voltage of 1.425 V corresponds with an internal VCO level of 75 mV. This fixed VCO level is called V_vco,start . The frequency will be reduced in relation to the VCO voltage between 75 mV and 50 mV (at levels larger than 75 mV, Ctrl voltage < 1.425V, the oscillator will run on maximum frequency f_oscH = 175 kHz typically). At 50 mV (V_vco,max), the frequency is reduced to the minimum level of 6 kHz. Valley switching is still active in this mode.
- **Minimum Frequency mode (MinF).** At VCO levels below 50 mV, the minimum frequency will remain on 6 kHz, which is called the 'MinF' mode. Because of this low frequency, it is possible to run at very low loads without having any output regulation problems.

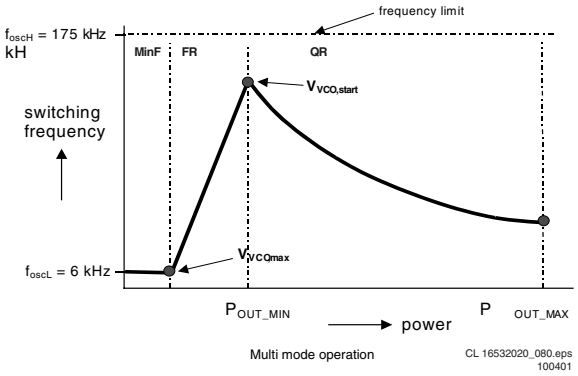


Figure 9-10 Different supply modes

Safe-Restart Mode

This mode is introduced to prevent the components from being destroyed during eventual system fault conditions. It is also used for the Burst mode. The Safe-Restart mode will be entered if it is triggered by one of the following functions:

- Over voltage protection,
- Short winding protection,
- Maximum 'on time' protection,
- V_cc reaching UVLO level (fold back during overload),
- Detecting a pulse for Burst mode,
- Over temperature protection.

When entering the Safe-Restart mode, the output driver is immediately disabled and latched. The V_cc winding will not charge the V_cc capacitor anymore and the V_cc voltage will drop until UVLO is reached. To recharge the V_cc capacitor, the internal current source (I_(restart)(vcc)) will be switched 'on' to initiate a new start-up sequence as described before. This Safe-Restart mode will persist until the controller detects no faults or burst triggers.

Standby

The set goes to Standby in the following cases:

- After pressing the 'standby' key on the remote control.
- When the set is in protection mode.

In Standby, the power supply works in 'burst mode'. Burst mode can be used to reduce the power consumption below 1 W at stand-by. During this mode, the controller is active (generating gate pulses) for only a short time and for a longer time inactive waiting for the next burst cycle.
In the active period, the energy is transferred to the secondary and stored in the buffer capacitor C_stab in front of the linear stabilizer (see figure below). During the inactive period, the load (e.g. microprocessor) discharges this capacitor. In this mode, the controller makes use of the Safe-Restart mode.

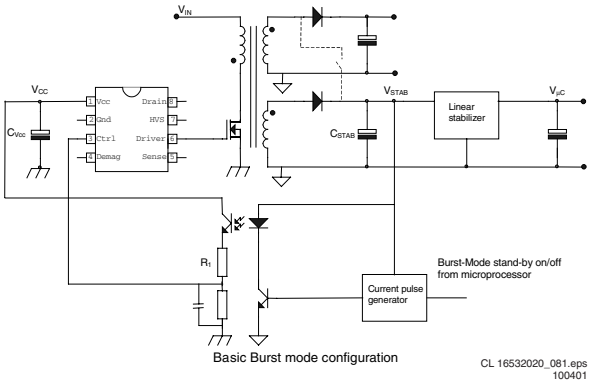


Figure 9-11 Supply standby mode (burst mode)

The system enters burst mode standby when the microprocessor activates the 'Stdby_con' line. When this line is pulled high, the base of TS7541 is allowed to go high. This is triggered by the current from collector TS7542. When TS7541 turns 'on', the opto-coupler (7515) is activated, sending a large current signal to pin 3 (Ctrl). In response to this signal, the IC stops switching and enters a 'hiccup' mode. This burst activation signal should be present for longer than the 'burst blank' period (typically 30 s): the blanking time prevents false burst triggering due to spikes.
Burst mode standby operation continues until the microcontroller pulls the 'Stdby_con' signal low again. The base of TS7541 is unable to go high, thus cannot turn 'on'. This will disable the burst mode. The system then enters the start-up sequence and begins normal switching behavior.

For a more detailed description of one burst cycle, three time intervals are defined:

- **t1: Discharge of V_cc when gate drive is active.** During the first interval, energy is transferred, which result in a ramp-up of the output voltage (V_stab) in front of the stabilizer. When enough energy is stored in the capacitor, the IC will be switched 'off' by a current pulse generated at the secondary side. This pulse is transferred to the primary side via the opto coupler. The controller will disable the output driver (safe restart mode) when the current pulse reaches a threshold level of 16 mA into the 'Ctrl' pin. A resistor R1 (R3519) is placed in series with the opto coupler, to limit the current going into the 'Ctrl' pin. Meanwhile the V_cc capacitor is discharged but has to stay above V_uvlo .
- **t2: Discharge of V_cc when gate drive is inactive.** During the second interval, the V_cc is discharged to V_uvlo. The output voltage will decrease depending on the load.
- **t3: Charge of V_cc when gate drive is inactive.** The third interval starts when the UVLO is reached. The internal current source charges the V_cc capacitor (also the soft start capacitor is recharged). Once the V_cc capacitor is charged to the start-up voltage, the driver is activated and a new burst cycle is started.

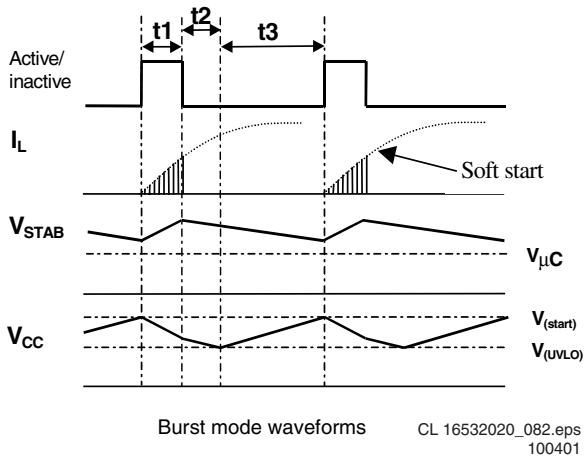


Figure 9-12 Burst mode waveforms

9.6.3 Protection Events

The SMPS IC 7520 has the following protection features:

Demagnetization sense
This feature guarantees discontinuous conduction mode operation in every situation. The oscillator will not start a new primary stroke until the secondary stroke has ended. This is to ensure that FET 7521 will not turn on until the demagnetization of transformer 5520 is complete. The function is an additional protection feature against:

- Saturation of the transformer.
- Damage of the components during initial start-up.
- An overload of the output.

The demag(netization) sense is realized by an internal circuit that guards the voltage (V_demag) at pin 4 that is connected to V_cc winding by resistor R1 (R3522).
The figure below shows the circuit and the idealized waveforms across this winding.

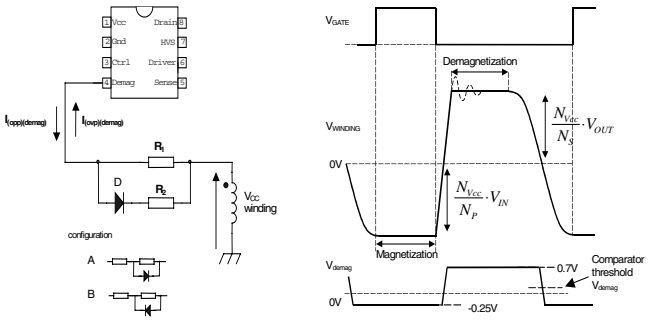


Figure 9-13 Demagnetization protection

Over Voltage Protection
The Over Voltage Protection ensures that the output voltage will remain below an adjustable level. This works by sensing the auxiliary voltage via the current flowing into pin 4 (DEM) during the secondary stroke. This voltage is a well-defined replica of the output voltage. Any voltage spikes are averaged by an internal filter.
If the output voltage exceeds the OVP trip level, the OVP circuit switches the power MOSFET 'off'.
Next, the controller waits until the 'under voltage lock out' level (UVLO = ± 9 V) is reached on pin 1 (V_cc). This is followed by a safe restart cycle, after which switching starts again. This process is repeated as long as the OVP condition exists. The output voltage at which the OVP function trips, is set by the demagnetization resistor R3522.

Over Current Protection
The internal OCP protection circuit limits the 'sense' voltage on pin 5 to an internal level.

Over Power Protection
During the primary stroke, the rectified AC input voltage is measured by sensing the current drawn from pin 4 (DEM). This current is dependent on the voltage on pin 9 of transformer 5520 and the value of R3522. The current information is used to adjust the peak drain current, which is measured via pin I_sense.

Short Winding Protection
If the 'sense' voltage on pin 5 exceeds the short winding protection voltage (0.75 V), the converter will stop switching. Once V_cc drops below the UVLO level, capacitor C2521 will be recharged and the supply will start again. This cycle will be repeated until the short circuit is removed (safe restart mode). The short winding protection will also protect in case of a secondary diode short circuit.
This protection circuit is activated after the leading edge blanking time (LEB).

LEB time
The LEB (Leading Edge Blanking) time is an internally fixed delay, preventing false triggering of the comparator due to current spikes. This delay determines the minimum 'on' time of the controller.

Over Temperature protection
When the junction temperature exceeds the thermal shutdown temperature (typ. 140 deg. C), the IC will disable the driver. When the V_cc voltage drops to UVLO, the V_cc capacitor will be recharged to the V(start) level. If the temperature is still too high, the V_cc voltage will drop again to the UVLO level (Safe-Restart mode). This mode will persist until the junction temperature drops 8 degrees typically below the shutdown temperature.

Mains dependent operation enabling level
To prevent the supply from starting at a low input voltage, which could cause audible noise, a mains detection is implemented (Mlevel). This detection is provided via pin 8, which detects the minimum start-up voltage between 60 and 100 V. As previous mentioned, the controller is enabled between 60 and 100 V. An additional advantage of this function is the protection against a disconnected buffer capacitor (C_in). In this case, the supply will not be able to start-up because the V_cc capacitor will not be charged to the start-up voltage.

9.7 Control

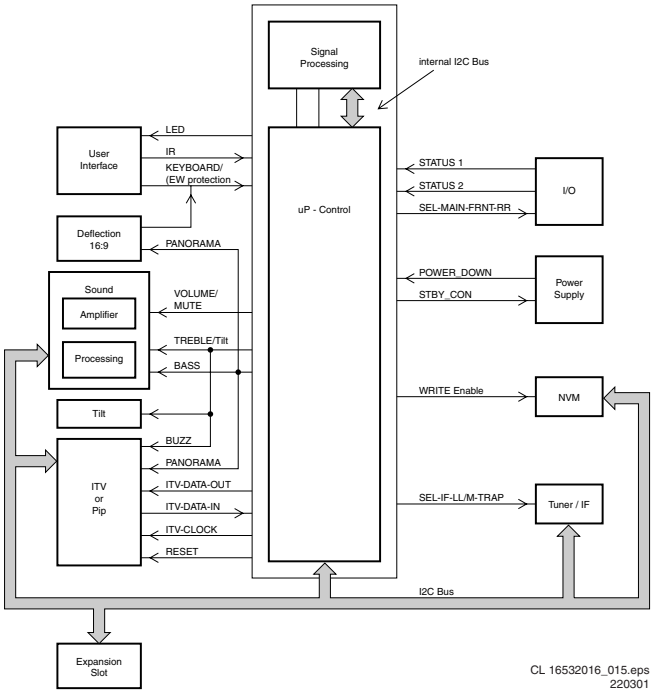


Figure 9-14 Block diagram set control

9.7.1 Introduction

The microprocessor part of the UOC, has the complete control and teletext on board. User menu, Service Default Mode, Service Alignment Mode and Customer Service Mode are generated by the uP. Communication to other ICs is done via the I2C-bus.

9.7.2 I2C-Bus

The main control system, which consists of the microprocessor part of the UOC (7200), is linked to the external devices (tuner, NVM, MSP, etc) by means of the I2C-bus. An internal I2C-bus is used to control other signal processing functions, like video processing, sound IF, vision IF, synchronization, etc.

9.7.3 User Interface

The 'L01.1L AC' uses a remote control with RC5 protocol. The incoming signal is connected to pin 67 of the UOC.

The 'Top Control' keyboard, connected to UOC pin 80, can also control the set. Button recognition is done via a voltage divider.

The front LED (6691) is connected to an output control line of the microprocessor (pin 5). It is activated to provide the user information about whether or not the set is working correctly (e.g., responding to the remote control, normal operation (USA only) or fault condition)

9.7.4 In- and Output Selection

For the control of the input and output selections, there are three lines:

- **STATUS1.** This signal provides information to the microprocessor on whether a video signal is available on the SCART1 AV input and output port (only for Europe). This signal is not connected in NAFTA sets.
- **STATUS2.** This signal provides information to the microprocessor on whether a video signal is available on the SCART2 AV input and output port (only for Europe). For sets with an SVHS input it provides the additional information if a Y/C or CVBS source is present. The presence of an external Y/C source makes this line 'high' while a CVBS source makes the line 'low'.
- **SEL-MAIN-FRNT-RR.** This is the source select control signal from the microprocessor. This control line is under user control or can be activated by the other two control lines.

9.7.5 Power Supply Control

The microprocessor part is supplied with 3.3 V and 3.9 V both derived from the 'MainAux' voltage via a 3V3 stabilizer (7560) and a diode.
Two signals are used to control the power supply:

- **Stdby_con.** This signal is generated by the microprocessor when over-current takes place at the 'MainAux' line. This is done to enable the power supply into standby burst mode, and to enable this mode during a protection. This signal is 'low' under normal operation conditions and goes to 'high' (3.3 V) under 'standby' and 'fault' conditions.
- **POWER_DOWN.** This signal is generated by the power supply. Under normal operating conditions, this signal is 'high' (3.3 V). During 'standby' mode, this signal is a pulse train of approx. 10 Hz and a 'high' duration of 5 ms. It is used to give information to the UOC about the fault condition in the Audio amplifier supply circuit. This information is generated by sensing the current on the 'MainAux' line (using voltage drop across R3564 to trigger TS7562). This signal goes 'low' when the DC-current on the 'MainAux' line exceeds 1.6 - 2.0 A. It is also used to give an early warning to the UOC about a power failure. Then the information is used to mute the sound amplifier to prevent a switch off noise and to solve the switch-off spot.

9.7.6 Protection Events

Several protection events are controlled by the UOC:

- **BC protection**, to protect the picture tube from a too high beam current. The UOC has the capability of measuring the normal back level current during the vertical flyback. So if for some reason the CRT circuit is malfunctioning (i.e. high beam current), the normal black current will be out of the 75 A range, and the UOC will trigger the power supply to shut down. However, this is a high beam-current situation, the TV screen will be bright white before the set is shut down.
- **E/W protection**, two protection mechanisms are built in, over-current and over-voltage.
  - In case of over-current due to defective parts in the line deflection output stage, a high current will flow through resistors 3405//3406. If this current is large enough to create a voltage drop of 0.7 V across 3405//3406, transistor TS7606 (in A7 diagram) will conduct and pin 80 of the UOC will be pulled down. Thereafter, the UOC will shut down the power supply. In case of further current increase, the fused resistor 3411 is built-in for double protection.
  - In case of a high voltage appearing across capacitor 2401 (dependent of the tube size), which is high enough to trigger zener diode 6401 into conduction, transistor TS7606 (in A7 diagram) will conduct and UOC is triggered to shut down the power supply.
- **I2C protection**, to check whether all I2C ICs are functioning.

In case one of these protections is activated, the set will go into 'standby'.

The 'on' and 'standby' LEDs are controlled via the UOC.

9.8 Abbreviation list

2CS	2 Carrier (or Channel) Stereo
ACI	Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AFT	Automatic Fine Tuning
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ATS	Automatic Tuning System
AV	External Audio Video
AVL	Automatic Volume Level
BC-PROT	Beam Current Protection
BCL	Beam Current Limitation
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BLC-INFORMATION	Black current information
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
B-TXT	Blue teletext
CBA	Circuit Board Assembly
CC	Closed Caption
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DBX	Dynamic Bass Expander
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Direction For Use: description for the end user
DNR	Dynamic Noise Reduction
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EHT	Extra High Tension
EHT-INFORMATION	Extra High Tension information
EU	Europe
EW	East West, related to horizontal deflection of the set
EXT	External (source), entering the set via SCART or Cinch
FBL	Fast Blanking: DC signal accompanying RGB signals
FILAMENT	Filament of CRT
FLASH	Flash memory
FM	Field Memory
FM	Frequency Modulation
HA	Horizontal Acquisition: horizontal sync pulse coming out of the HIP
HFB	Horizontal Flyback Pulse: horizontal sync pulse from large signal deflection
HP	Headphone
Hue	Color phase control for NTSC (not the same as 'Tint')
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus
IF	Intermediate Frequency
IIC	Integrated IC bus
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in 'pairs', causing line flicker.
ITV	Institutional TV
LATAM	Latin America
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LNA	Low Noise Amplifier
LS	Large Screen
LS	Loudspeaker
LSP	Large signal panel
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MSP	Multi standard Sound Processor: ITT sound decoder
MUTE	Mute-Line
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
OB	Option Byte
OC	Open Circuit
OSD	On Screen Display
PAL	Phase Alternating Line. Color system mainly used in West Europe (color carrier = 4.433619 MHz) and South America (color carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit board
PIP	Picture In Picture
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POR	Power-On Reset
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PTP	Picture Tube Panel (or CRT-panel)
RAM	Random Access Memory
RC	Remote Control handset
RC5	Remote Control system 5, signal from the remote control receiver
RGB	Red Green Blue
ROM	Read Only Memory
SAM	Service Alignment Mode
SAP	Second Audio Program
SC	Sandcastle: pulse derived from sync signals

S/C	Short Circuit
SCAVEM	Scan Velocity Modulation
SCL	Serial Clock
SDA	Serial Data
SDM	Service Default Mode
SECAM	SEequence Couleur Avec Memoire. Color system mainly used in France and East Europe. Color carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SS	Small Screen
STBY	Standby
SVHS	Super Video Home System
SW	Software
THD	Total Harmonic Distortion
TXT	Teletext
uP	Microprocessor
UOC	Ultimate One Chip
VA	Vertical Acquisition
VBAT	Main supply voltage for the deflection stage (mostly 141 V)
V-chip	Violence Chip
VCR	Video Cassette Recorder
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YC	Luminance (Y) and Chrominance (C) signal

9.9 IC Data Sheets

In this paragraph, the internal block diagrams and pinning are given of ICs that are drawn as a 'black box' in the electrical diagrams (with the exception of 'memory' and 'logic' ICs).

This is not applicable for this manual (all ICs are drawn with internal block diagrams)

10. Spare Parts List

Mono Carrier [A] + CRT Panel [B]

Various

0127	4822 265 11253	Fuse holder 2p
0129	3139 120 10151	NTC holder
0136	4822 492 70788	IC clamp
0137	4822 492 70289	IC fix
0138	4822 492 70788	IC clamp
0139	3122 121 24785	Spring fix IC
0139	4822 492 62076	Transistor clamp
0140	4822 492 70289	IC fix
0141	4822 492 70788	IC clamp
0152	3104 301 08411	Cable DIP 6p/560/6p DIP
0152	3104 301 09421	Cable 6p 400mm
0152	3139 121 08841	Cable 6p/400/6p
0153	3104 301 08381	Cable assy
0153	3104 311 00681	Cable 5p/560/5p
0153	3139 121 07951	Cable 5p/480/5p
0211	2422 025 16374	Connector 2p m
0211	4822 265 20723	Connector 2p m
0212	4822 267 10774	2P male red
0214	4822 267 10734	Connector 5p m
0219	2422 025 12482	Connector 6P
0220	4822 265 30735	Connector 5p m
0221	4822 267 10966	Connector 2p
0222	2422 025 10646	2p male
0223	2422 026 05185	Socket CINCH 4p f YEWH
0223	2422 026 05236	Socket CINCH 9p f
0225	2422 026 04926	Socket 4P
0231	2422 128 02972	Mains switch
0239	2422 025 16382	Connector 3p m
0243	2422 025 04854	6p female
0244	4822 265 30735	Connector 5p m
0245	2422 025 04854	6p female
0246	4822 267 10734	Connector 5p m
0254	2422 500 80076	CRT 9p female
0256	2422 500 80058	Connector 9p
0267	4822 267 10735	Connector 3p m
0268	4822 267 10735	Connector 3p m
0269	2422 026 05182	Socket CINCH 3p f YEWHRE
0278	4822 267 10735	Connector 3p m
0280	4822 267 10565	Connector 4p
1000	2422 542 90098	TEDH9-200A
1000	2422 542 90122	TEDE9-228B
1002	2422 549 44223	SAW OFWK7260M
1002	2422 549 44518	SAW 45.75MHz OFWM1971M
1002	2422 549 44722	SAW38.9MHzOFWK7257M
1004	2422 549 44719	SAW38.9MHzOFWK9362M
1200	4822 242 10315	TPT02B-TF21
1200	4822 242 81572	TPS6,0MB-TF21
1200	4822 242 81978	TPS4,5MB-TF21
1201	4822 242 81572	TPS6,0MB-TF21
1202	4822 242 81978	TPS4,5MB-TF21
1500	2422 086 10914	Fuse 4A 250V
1515	2422 132 07467	Relay 1p 12V 5A LKS1AF
1600	4822 276 13775	Switch
1601	4822 276 13775	Switch
1602	4822 276 13775	Switch
1603	4822 276 13775	Switch
1660	2422 543 01203	Crystal 12.00MHz
1831	4822 242 10769	Crystal 18.432MHz
1861	4822 242 10359	CSB503F58

⊣⊢

2003	5322 126 11583	10nF 10% 50V 0603
2004	3198 017 34730	47nF 16V 0603
2005	4822 124 40248	10µF 20% 63V
2006	4822 124 80791	470µF 20% 16V
2007	2238 586 59812	100nF 20-80% 50V 0603
2008	4822 124 40207	100µF 20% 25V
2009	2238 916 15641	22nF 10% 25V 0603
2101	4822 126 13482	470nF 80/20% 16V
2102	4822 122 33761	22pF 5% 50V
2103	4822 126 14241	330pF 50V 0603
2104	4822 126 14241	330pF 50V 0603
2105	4822 124 40248	10µF 20% 63V
2106	4822 124 40248	10µF 20% 63V
2111	4822 122 33761	22pF 5% 50V
2112	4822 122 33761	22pF 5% 50V
2113	4822 122 33761	22pF 5% 50V
2121	4822 122 33761	22pF 5% 50V
2122	4822 126 14241	330pF 50V 0603
2123	4822 126 14491	2.2µF -20+80% 10V 0805
2124	4822 126 14241	330pF 50V 0603
2125	4822 126 14491	2.2µF -20+80% 10V 0805
2131	4822 126 14241	330pF 50V 0603
2132	4822 126 14491	2.2µF -20+80% 10V 0805
2133	4822 126 14241	330pF 50V 0603
2134	4822 126 14491	2.2µF -20+80% 10V 0805
2135	4822 122 33761	22pF 5% 50V
2136	4822 122 33761	22pF 5% 50V
2141	4822 126 14241	330pF 50V 0603
2143	2238 586 59812	100nF 20-80% 50V 0603
2150	2238 786 19852	150nF 16V 0603
2172	2020 552 94427	100pF 5% 50v 0603
2173	4822 126 13883	220pF 5% 50V
2184	4822 126 14491	2.2µF -20+80% 10V 0805
2187	4822 126 14491	2.2µF -20+80% 10V 0805
2201	2238 586 59812	100nF 20-80% 50V 0603
2202	2238 586 59812	100nF 20-80% 50V 0603
2203	2238 586 59812	100nF 20-80% 50V 0603
2204	2238 586 59812	100nF 20-80% 50V 0603
2205	4822 126 13879	220nF 20% 16V
2208	2238 586 59812	100nF 20-80% 50V 0603
2209	4822 124 40769	4.7µF 20% 100V
2210	3198 017 41050	1µF 10V 0603
2211	3198 017 44740	470nF 10V 0603
2213	2238 916 15641	22nF 10% 25V 0603
2214	2238 916 15641	22nF 10% 25V 0603
2215	2238 916 15641	22nF 10% 25V 0603
2216	2020 012 93728	2200µF 20% 10V
2216	4822 124 81144	1000µF 16V
2217	2238 916 15641	22nF 10% 25V 0603
2219	4822 126 13879	220nF 20% 16V
2220	4822 121 51252	470nF 5% 63V
2221	2238 916 15641	22nF 10% 25V 0603
2226	2020 552 94427	100pF 5% 50v 0603
2226	5322 126 11579	3.3nF 10% 63V
2227	4822 126 13193	4.7nF 10% 63V
2228	3198 016 38210	820pF 25V
2229	4822 124 40248	10µF 20% 63V
2230	4822 124 40769	4.7µF 20% 100V
2241	4822 126 14247	1.5nF 50V 0603
2242	3198 017 41050	1µF 10V 0603
2243	4822 126 14238	2.2nF 50V 0603
2243	5322 126 11582	6.8nF 10% 63V
2244	5322 121 42386	100nF 5% 63V
2245	2238 786 19856	330nF 0603 16V
2245	4822 126 13879	220nF 20% 16V
2246	4822 124 40769	4.7µF 20% 100V
2247	2020 012 93728	2200µF 20% 10V
2247	4822 124 81144	1000µF 16V
2248	2238 916 15641	22nF 10% 25V 0603
2249	2238 916 15641	22nF 10% 25V 0603
2250	4822 124 22652	2.2µF 20% 50V
2252	3198 016 31020	1nF 25V 0603
2253	3198 016 31020	1nF 25V 0603
2254	4822 051 20008	Jumper 0805
2330	4822 121 51473	470nF 20% 63V
2340	4822 124 11565	10µF 20% 250V
2341	4822 126 13599	3.3nF 10% 500V
2342	5322 116 80853	560pF 5% 63V
2343	4822 126 13451	2.2nF 10% 2kV
2344	4822 126 14585	100nF 10% 50V
2345	4822 122 31175	1nF 10% 500V
2360	4822 126 13193	4.7nF 10% 63V
2362	4822 126 13883	220pF 5% 50V
2364	4822 126 11669	27pF 5% 50V 0603
2365	4822 126 11669	27pF 5% 50V 0603
2366	4822 126 11669	27pF 5% 50V 0603
2367	4822 126 13193	4.7nF 10% 63V
2368	4822 124 40433	47µF 20% 25V
2369	5322 122 32658	22pF 5% 50V
2372	2020 012 93318	10µF 20% 160V
2373	4822 126 13193	4.7nF 10% 63V
2375	5322 126 10223	4.7nF 10% 63V
2378	4822 126 13499	220pF 5% 50V
2379	5322 124 40641	10µF 20% 100V
2380	5322 126 10223	4.7nF 10% 63V
2381	4822 126 13193	4.7nF 10% 63V
2401	2038 035 13503	2.2µF 20% 50V
2402	4822 122 31177	470pF 10% 500V
2404	4822 124 41751	47µF 20% 50V
2405	4822 124 12379	220µF 25V
2415	5322 122 31863	330pF 5% 63V
2441	4822 124 21913	1µF 20% 63V
2443	4822 126 13751	47nF 10% 63V
2444	4822 124 21913	1µF 20% 63V
2448	4822 122 31211	100pF 10% 500V
2448	4822 126 12263	220pF 10% 2kV
2450	4822 124 11575	47µF 20% 160V
2451	4822 121 41856	22nF 5% 250V
2455	4822 124 40433	47µF 20% 25V
2457	2222 479 90014	0.22µF 250V
2457	2222 479 90016	270nF 5% 250V
2457	4822 121 10518	390nF 5% 250V
2457	4822 121 43888	360nF 5% 250V
2458	2022 031 00138	2.2µF 20% 100V
2459	4822 126 13185	680pF 10% 500V
2460	5322 122 32531	100pF 5% 50V
2463	2020 558 90611	1.8nF 10% 2kV
2463	4822 126 11503	820pF 10% 2kV
2463	4822 126 13862	1.5nF 10% 2kV
2463	4822 126 14237	470pF 10% 2kV
2464	4822 121 10739	2.2µF 5% 160V
2465	2222 375 24153	15nF 5% 1kV
2465	4822 121 70618	12nF 5% 1600V
2465	4822 121 70637	8.2nF 5% 1600V
2466	2222 347 90219	15nF 10% 400V
2466	5322 121 42532	18nF 10% 400V
2467	4822 121 40482	68nF 10% 250V
2467	4822 121 40488	22nF 10% 400V
2468	2222 347 90219	15nF 10% 400V
2468	4822 121 40488	22nF 10% 400V
2468	5322 121 42532	18nF 10% 400V
2471	5322 121 42386	100nF 5% 63V
2472	4822 121 41854	150nF 5% 63V
2472	4822 121 43693	10nF 100V
2473	5322 121 42386	100nF 5% 63V
2474	4822 122 33127	2.2nF 10% 63V
2475	4822 122 33127	2.2nF 10% 63V
2476	5322 126 10223	4.7nF 10% 63V
2480	4822 124 11965	47µF 20% 25V
2480	4822 124 40433	47µF 20% 25V
2481	4822 122 31177	470pF 10% 500V
2482	2222 479 90051	120nF 5% 250V
2482	4822 121 40482	68nF 10% 250V
2482	4822 121 51408	33nF 10% 250V
2485	2022 031 00137	4.7µF 20% 250V
2486	2022 031 00139	470µF 20% 16V
2487	2038 035 13508	47µF 20% 50V
2488	4822 124 81145	1000µF 16V 20%
2489	2022 031 00139	470µF 20% 16V
2491	4822 122 31175	1nF 10% 500V
2500	4822 126 13589	470nF 275V
2501	4822 126 14153	2.2nF 10% 1kV
2502	4822 126 14153	2.2nF 10% 1kV
2503	4822 124 12415	220µF 20% 400V
2503	4822 124 42159	330µF 20% 400V
2505	4822 126 13599	3.3nF 10% 500V
2505	4822 126 14153	2.2nF 10% 1kV
2506	4822 121 10798	33nF 5% 400V
2507	9965 000 09661	470pF 50V 10%
2508	4822 122 50116	470pF 10% 1kV
2509	4822 121 10711	100nF 20% 275V
2515	4822 126 14049	1.5nF 20% 250V
2516	4822 126 13867	330P 20% 250V
2520	4822 122 33177	10nF 20% 50V
2520	4822 126 14585	100nF 10% 50V
2521	4822 124 81151	22µF 50V
2522	4822 126 14585	100nF 10% 50V
2523	4822 126 13862	1.5nF 10% 2kV
2525	9965 000 09661	470pF 50V 10%
2526	4822 126 13482	470nF 80/20% 16V
2527	4822 122 33127	2.2nF 10% 63V
2528	5322 122 31647	1nF 10% 63V
2540	4822 122 33177	10nF 20% 50V
2541	4822 122 33177	10nF 20% 50V
2560	4822 126 14152	680pF 10% 1kV
2561	2020 021 91496	100µF 20% 160V
2562	5322 122 32331	1nF 10% 100V
2563	5322 121 42386	100nF 5% 63V
2564	2020 021 91374	2200µH 20% 25V
2564	4822 124 12417	2200µF 20% 25V
2567	4822 124 40433	47µF 20% 25V
2568	4822 124 21913	1µF 20% 63V
2580	4822 124 81286	47µF 20% 16V
2581	4822 124 81151	22µF 50V
2601	4822 126 14076	220nF 25V. 20%
2602	2020 552 94427	100pF 5% 50v 0603
2604	4822 124 40248	10µF 20% 63V
2606	3198 016 31020	1nF 25V 0603
2606	3198 017 44740	470nF 10V 0603
2607	2222 867 15339	33pF 5% 50V 0603
2608	3198 017 41050	1µF 10V 0603
2609	2222 867 15339	33pF 5% 50V 0603
2611	3198 017 41050	1µF 10V 0603
2612	4822 126 13956	68pF 5% 63V 0603
2613	4822 126 13956	68pF 5% 63V 0603
2615	5322 126 11578	1nF 10% 50V 0603
2618	3198 017 41050	1µF 10V 0603
2619	4822 126 14043	1µF 20% 16V
2691	4822 124 12379	220µF 25V

2802	4822 126 13879	220nF 20% 16V
2803	4822 126 13879	220nF 20% 16V
2810	4822 126 14491	2.2µF -20+80% 10V 0805
2813	4822 126 14491	2.2µF -20+80% 10V 0805
2816	3198 017 44740	470nF 10V 0603
2831	3198 016 31080	1pF 25% 50V 0603
2832	3198 016 31080	1pF 25% 50V 0603
2833	4822 126 11785	47pF 5% 50V 0603
2834	4822 126 13881	470pF 5% 50V
2835	4822 126 13883	220pF 5% 50V
2836	4822 126 14247	1.5nF 50V 0603
2837	4822 124 40769	4.7µF 20% 100V
2840	2238 586 59812	100nF 20-80% 50V 0603
2841	4822 124 40248	10µF 20% 63V
2842	2238 586 59812	100nF 20-80% 50V 0603
2843	4822 124 40248	10µF 20% 63V
2844	4822 124 40248	10µF 20% 63V
2845	2238 586 59812	100nF 20-80% 50V 0603
2846	4822 124 40207	100µF 20% 25V
2849	3198 016 31020	1nF 25V 0603
2850	3198 016 31020	1nF 25V 0603
2852	3198 016 31020	1nF 25V 0603
2854	3198 016 31020	1nF 25V 0603
2855	2222 867 15339	33pF 5% 50V 0603
2855	4822 126 11669	27pF 5% 50V 0603
2856	4822 122 33752	15pF 5% 50V
2856	4822 126 11785	47pF 5% 50V 0603
2857	4822 122 33753	150pF 5% 50V
2860	4822 126 14225	56pF 5% 50V 0603
2860	4822 126 14508	180pF 5% 50V
2862	4822 126 14491	2.2µF -20+80% 10V 0805
2864	4822 124 22652	2.2µF 20% 50V
2865	4822 124 22652	2.2µF 20% 50V
2866	4822 126 14491	2.2µF -20+80% 10V 0805
2867	4822 126 13617	1,8nF 10% 50V
2868	4822 122 33753	150pF 5% 50V
2869	5322 121 42465	68nF 5% 63V
2870	5322 121 42465	68nF 5% 63V
2871	4822 122 33753	150pF 5% 50V
2872	4822 126 13617	1,8nF 10% 50V
2873	4822 126 14491	2.2µF -20+80% 10V 0805
2874	4822 124 40207	100µF 20% 25V
2875	4822 124 40207	100µF 20% 25V
2876	4822 124 40769	4.7µF 20% 100V
2877	4822 124 40248	10µF 20% 63V
2878	4822 124 21913	1µF 20% 63V
2879	4822 126 13193	4.7nF 10% 63V
2880	2238 916 15641	22nF 10% 25V 0603
2883	4822 124 80791	470µF 20% 16V
2884	4822 124 22652	2.2µF 20% 50V
2885	4822 121 42408	220nF 10% 50V
2886	4822 126 13879	220nF 20% 16V
2892	2238 586 59812	100nF 20-80% 50V 0603
2893	2238 586 59812	100nF 20-80% 50V 0603
2894	4822 126 13883	220pF 5% 50V
2895	4822 126 14249	560pF 10% 50V 0603
2897	4822 126 14315	390pF 5% 50V 0603
2898	5322 126 11583	10nF 10% 50V 0603
2902	4822 124 11769	220µF 20% 50V
2902	4822 124 80061	1000µF 20% 25V
2902	4822 124 81144	1000µF 16V
2903	4822 124 21913	1µF 20% 63V
2904	4822 122 33735	27nF 10% 63V
2904	4822 126 13482	470nF 80/20% 16V
2905	4822 122 32614	1.2nF 10% 63V
2905	5322 122 31647	1nF 10% 63V
2906	4822 122 33735	27nF 10% 63V
2906	4822 126 13482	470nF 80/20% 16V
2907	4822 122 32614	1.2nF 10% 63V
2907	5322 122 31647	1nF 10% 63V
2908	4822 124 40248	10µF 20% 63V
2910	4822 122 33177	10nF 20% 50V
2910	4822 122 33891	3.3nF 10% 63V
2911	4822 122 32614	1.2nF 10% 63V
2911	4822 122 33177	10nF 20% 50V
2911	4822 122 33891	3.3nF 10% 63V
2950	4822 126 14241	330pF 50V 0603

–WW–

3000	4822 116 52175	100Ω 5% 0.5W
3001	4822 116 52175	100Ω 5% 0.5W
3002	4822 051 30008	Jumper 0603
3003	4822 051 30152	1.5kΩ 5% 0.062W
3004	4822 117 12902	8.2kΩ 1% 0.063W 0603
3005	4822 116 52175	100Ω 5% 0.5W
3006	4822 051 30222	2.2kΩ 5% 0.062W
3007	4822 051 30682	6.8kΩ 5% 0.062W
3008	4822 051 30222	2.2kΩ 5% 0.062W
3101	4822 116 52199	68Ω 5% 0.5W
3102	4822 051 30102	1kΩ 5% 0.062W
3103	4822 116 83868	150Ω 5% 0.5W
3104	4822 117 12891	220kΩ 1% 0.063W 0603
3105	4822 116 83868	150Ω 5% 0.5W
3106	4822 117 12891	220kΩ 1% 0.063W 0603
3111	4822 116 52201	75Ω 5% 0.5W
3112	4822 116 52175	100Ω 5% 0.5W
3113	4822 116 52201	75Ω 5% 0.5W
3114	4822 116 52175	100Ω 5% 0.5W
3115	4822 116 52201	75Ω 5% 0.5W
3116	4822 116 52175	100Ω 5% 0.5W
3123	4822 116 83868	150Ω 5% 0.5W
3124	4822 117 12925	47kΩ 1% 0.063W 0603
3125	4822 116 83868	150Ω 5% 0.5W
3126	4822 117 12925	47kΩ 1% 0.063W 0603
3131	4822 116 83868	150Ω 5% 0.5W
3132	4822 117 12925	47kΩ 1% 0.063W 0603
3133	4822 116 83868	150Ω 5% 0.5W
3134	4822 117 12925	47kΩ 1% 0.063W 0603
3135	4822 116 52201	75Ω 5% 0.5W
3136	4822 116 52175	100Ω 5% 0.5W
3141	4822 050 11002	1kΩ 1% 0.4W
3149	4822 117 13632	100kΩ 1% 0603 0.62W
3150	4822 051 30154	150kΩ 5% 0.062W
3154	4822 116 52289	5.6kΩ 5% 0.5W
3156	4822 050 21003	10kΩ 1% 0.6W
3157	4822 051 30152	1.5kΩ 5% 0.062W
3158	4822 051 30103	10kΩ 5% 0.062W
3159	4822 051 20122	1.2kΩ 5% 0.1W
3172	4822 116 83961	6.8kΩ 5%
3180	4822 051 30683	68kΩ 5% 0.062W
3181	4822 051 30124	120kΩ 5% 0.062W
3190	4822 051 30683	68kΩ 5% 0.062W
3200	4822 116 83881	390Ω 5% 0.5W
3201	4822 116 52175	100Ω 5% 0.5W
3202	4822 116 52175	100Ω 5% 0.5W
3203	4822 116 52175	100Ω 5% 0.5W
3204	4822 116 52257	22kΩ 5% 0.5W
3205	4822 051 30102	1kΩ 5% 0.062W
3206	4822 051 30333	33kΩ 5% 0.062W
3206	4822 117 13632	100kΩ 1% 0603 0.62W
3207	4822 050 11002	1kΩ 1% 0.4W
3208	4822 051 30151	150Ω 5% 0.062W
3208	4822 051 30221	220Ω 5% 0.062W
3208	4822 051 30391	390Ω 5% 0.062W
3209	4822 051 30101	100Ω 5% 0.062W
3209	4822 051 30689	68Ω 5% 0.063W 0603
3209	4822 117 13501	82Ω 5% 0.62W 0603
3210	4822 116 52283	4.7kΩ 5% 0.5W
3211	4822 116 52283	4.7kΩ 5% 0.5W
3212	4822 051 30471	470Ω 5% 0.062W
3213	4822 116 52226	560Ω 5% 0.5W
3213	4822 116 83883	470Ω 5% 0.5W
3217	4822 051 30334	330kΩ 5% 0.062W
3218	4822 117 12864	82kΩ 5% 0.6W
3219	4822 051 30222	2.2kΩ 5% 0.062W
3220	4822 116 52175	100Ω 5% 0.5W
3221	4822 116 52226	560Ω 5% 0.5W
3222	4822 116 52175	100Ω 5% 0.5W
3226	4822 051 30561	560Ω 5% 0.062W
3229	4822 117 12968	820Ω 5% 0.62W
3230	4822 051 30271	270Ω 5% 0.062W
3231	4822 051 30561	560Ω 5% 0.062W
3232	4822 051 30222	2.2kΩ 5% 0.062W
3235	4822 116 52175	100Ω 5% 0.5W
3241	4822 051 30223	22kΩ 5% 0.062W
3242	4822 051 30273	27kΩ 5% 0.062W
3244	4822 116 52231	820Ω 5% 0.5W
3245	5322 117 13064	39kΩ 1% 0.063W 0603
3246	4822 051 30103	10kΩ 5% 0.062W
3247	4822 051 30474	470kΩ 5% 0.062W
3247	4822 051 30684	680kΩ 5% 0.062W
3247	4822 117 12889	270kΩ 1% 0.063W 0603
3248	4822 051 30333	33kΩ 5% 0.062W
3249	4822 116 52231	820Ω 5% 0.5W
3250	4822 116 52283	4.7kΩ 5% 0.5W
3251	4822 116 52175	100Ω 5% 0.5W
3256	4822 051 30102	1kΩ 5% 0.062W
3257	3198 021 31060	10MΩ 5% 0603
3258	2120 108 92641	180kΩ 1%
3258	2322 702 60394	390kΩ 5% 0.062W 0603
3258	4822 117 12891	220kΩ 1% 0.063W 0603
3258	4822 117 13632	100kΩ 1% 0603 0.62W
3259	4822 051 30474	470kΩ 5% 0.062W
3331	4822 116 52175	100Ω 5% 0.5W
3332	3198 013 01020	1kΩ 2% 0.5W
3333	4822 116 52175	100Ω 5% 0.5W
3334	3198 013 01020	1kΩ 2% 0.5W
3335	4822 116 52175	100Ω 5% 0.5W
3336	3198 013 01020	1kΩ 2% 0.5W
3340	4822 052 11109	10Ω 5% 0.5W
3341	4822 052 10108	1Ω 5% 0.33W
3342	4822 052 10108	1Ω 5% 0.33W
3343	3198 013 01520	1.5kΩ 2% 0.5W
3344	4822 116 52191	33Ω 5% 0.5W
3345	4822 117 13016	VDR 1mA/50V
3346	4822 116 52191	33Ω 5% 0.5W
3360	4822 051 30393	39kΩ 5% 0.062W
3361	4822 051 30103	10kΩ 5% 0.062W
3362	4822 051 30393	39kΩ 5% 0.062W
3363	4822 051 30221	220Ω 5% 0.062W
3367	4822 050 21003	10kΩ 1% 0.6W
3368	4822 116 83872	220Ω 5% 0.5W
3369	4822 051 30222	2.2kΩ 5% 0.062W
3373	4822 051 30102	1kΩ 5% 0.062W
3374	4822 116 81154	2.2Ω 5% 0.5W
3375	4822 051 30273	27kΩ 5% 0.062W
3376	4822 116 52297	68kΩ 5% 0.5W
3377	4822 116 83883	470Ω 5% 0.5W
3378	4822 117 11373	100Ω 1% 0805
3380	4822 051 30683	68kΩ 5% 0.062W
3381	4822 051 30273	27kΩ 5% 0.062W
3383	4822 051 30102	1kΩ 5% 0.062W
3384	4822 116 81154	2.2Ω 5% 0.5W
3385	2322 257 41103	10kΩ 5% 5W
3386	4822 052 10109	10Ω 5% 0.33W
3400	4822 116 52219	330Ω 5% 0.5W
3401	4822 050 23303	33k 1% 0.6W
3401	4822 116 52297	68kΩ 5% 0.5W
3403	4822 050 28203	82kΩ 1% 0.6W
3403	4822 116 52234	100kΩ 5% 0,5W
3403	4822 116 52304	82k 5% 0.5W
3404	4822 050 11002	1kΩ 1% 0.4W
3405	4822 050 24708	4.7Ω 1% 0.6W
3406	4822 050 24708	4.7Ω 1% 0.6W
3408	4822 116 52175	100Ω 5% 0.5W
3410	4822 050 21003	10kΩ 1% 0.6W
3411	4822 052 10478	4Ω7 5% 0.33W
3441	4822 117 11373	100Ω 1% 0805
3442	4822 051 20008	Jumper 0805
3443	4822 051 20105	1MΩ 5% 0.1W
3445	4822 116 52244	15kΩ 5% 0.5W
3446	4822 116 52289	5.6kΩ 5% 0.5W
3447	2122 101 02081	56Ω 5%
3447	4822 116 52213	180Ω 5% 0.5W
3448	4822 116 52231	820Ω 5% 0.5W
3449	4822 116 52199	68Ω 5% 0.5W
3450	4822 116 52191	33Ω 5% 0.5W
3451	4822 052 10109	10Ω 5% 0.33W
3451	4822 052 10398	3.9Ω 5% 0,33W
3452	4822 050 24703	47kΩ 1% 0.6W
3453	4822 050 11002	1kΩ 1% 0.4W
3454	4822 050 21503	15kΩ 1% 0.6W
3455	4822 053 11688	6.8Ω 5% 2W
3456	4822 051 20008	Jumper 0805
3457	4822 051 20008	Jumper 0805
3458	4822 050 11002	1kΩ 1% 0.4W
3459	4822 053 11153	15kΩ 5% 2W
3460	4822 116 52276	3.9kΩ 5% 0.5W
3463	4822 116 52191	33Ω 5% 0.5W
3465	4822 050 22703	27kΩ 1% 0.6W
3468	4822 116 52213	180Ω 5% 0.5W
3468	4822 116 52219	330Ω 5% 0.5W
3469	4822 116 52234	100kΩ 5% 0,5W
3469	4822 116 52269	3.3kΩ 5% 0.5W
3470	3198 021 52240	220kΩ 5% 0805
3470	4822 051 20274	270kΩ 5% 0.1W
3470	4822 051 20474	470kΩ 5% 0.1W
3471	4822 050 23908	3.9Ω 1% 0.6W
3471	4822 050 25608	5.6Ω 1% 0.6W
3472	4822 050 23308	3.3Ω 1% 0.6W
3472	4822 050 23908	3.9Ω 1% 0.6W
3473	4822 050 22202	2.2kΩ 1% 0.6W
3473	4822 050 23908	3.9Ω 1% 0.6W
3473	4822 050 26808	6.8Ω 1% 0.6W
3474	4822 050 22202	2.2kΩ 1% 0.6W
3475	4822 050 22202	2.2kΩ 1% 0.6W
3477	4822 116 83868	150Ω 5% 0.5W
3478	4822 116 83868	150Ω 5% 0.5W
3479	4822 117 12955	2.7kΩ 1% 0.1W 0805
3480	2122 101 02083	1.5Ω 5% 0,5W
3481	4822 050 21003	10kΩ 1% 0.6W
3481	4822 050 21203	12kΩ 1% 0,6W
3481	4822 050 21503	15kΩ 1% 0.6W
3481	4822 050 21803	18kΩ 1% 0,6W
3482	4822 050 21003	10kΩ 1% 0.6W
3482	4822 050 21203	12kΩ 1% 0,6W
3482	4822 050 21503	15kΩ 1% 0.6W
3482	4822 050 28202	8.2kΩ 1% 0,6W
3484	4822 116 52276	3.9kΩ 5% 0.5W
3486	4822 053 12229	22Ω 5% 3W
3488	4822 052 11478	4.7Ω 5% 0.5W
3490	4822 116 52256	2.2kΩ 5% 0.5W
3490	4822 116 52303	8.2kΩ 5% 0.5W
3491	4822 117 10833	10kΩ 1% 0.1W
3492	4822 051 10102	1kΩ 2% 0.25W
3492	4822 051 20471	470Ω 5% 0.1W
3493	4822 052 10109	10Ω 5% 0.33W
3493	4822 052 10688	6.8Ω 5% 0.33W
3494	4822 052 11478	4.7Ω 5% 0.5W
3495	4822 051 20223	22kΩ 5% 0.1W

3496	4822 117 10837	100kΩ 1% 0.1W
3497	4822 117 10837	100kΩ 1% 0.1W
3498	4822 117 11383	12kΩ 1% 0.1W
3499	4822 051 20471	470Ω 5% 0.1W
3500	4822 053 21335	3.3MΩ 5% 0.5W
3501	4822 053 21335	3.3MΩ 5% 0.5W
3503	4822 116 21224	VDR 1mA/387V
3504	4822 116 10105	PTC 9Ω 220V
3506	4822 053 21155	1.5Ω 5% 0.5W
3507	4822 252 11215	Spark gap
3508	4822 116 83872	220Ω 5% 0.5W
3509	3198 013 04710	470Ω 20% 0.5W
3510	4822 117 12765	4.7Ω 20% 3W
3519	4822 116 83876	270Ω 5% 0.5W
3520	4822 051 20122	1.2kΩ 5% 0.1W
3521	4822 050 24708	4.7Ω 1% 0.6W
3521	4822 116 52186	22Ω 5% 0.5W
3522	4822 051 20334	330kΩ 5% 0,1W
3522	4822 051 20394	390kΩ 5% 0.1W
3523	4822 052 10479	47Ω 5% 0.33W
3524	4822 117 11148	56kΩ 1% 0.1W
3525	4822 051 10102	1kΩ 2% 0.25W
3526	3198 012 11570	0.15Ω 5% 1W
3526	4822 117 11744	0.22Ω 5% 1W
3527	4822 117 11744	0.22Ω 5% 1W
3528	4822 051 20008	Jumper 0805
3528	4822 051 20109	10Ω 5% 0.1W
3529	4822 117 10834	47kΩ 1% 0.1W
3530	4822 117 10833	10kΩ 1% 0.1W
3531	4822 051 20472	4.7kΩ 5% 0.1W
3532	4822 052 10222	2.2kΩ 5% 0.33W
3541	4822 051 20471	470Ω 5% 0.1W
3542	4822 117 11139	1.5kΩ 1% 0.1W
3543	4822 050 28203	82kΩ 1% 0.6W
3544	4822 117 11145	4.7kΩ 1% 0,1W
3545	4822 051 20274	270kΩ 5% 0.1W
3548	4822 116 83933	15kΩ 1% 0.1W
3552	4822 051 20472	4.7kΩ 5% 0.1W
3552	4822 117 10833	10kΩ 1% 0.1W
3557	4822 051 10102	1kΩ 2% 0.25W
3557	4822 117 11139	1.5kΩ 1% 0.1W
3561	4822 116 52213	180Ω 5% 0.5W
3561	4822 116 83872	220Ω 5% 0.5W
3562	4822 117 11383	12kΩ 1% 0.1W
3563	4822 051 20822	8.2kΩ 5% 0,1W
3565	4822 053 10331	330Ω 5% 1W
3566	4822 117 11449	2.2kΩ 5% 0.1W 0805
3569	4822 051 20562	5.6kΩ 5% 0.1W 0805
3580	4822 117 10834	47kΩ 1% 0.1W
3591	4822 052 10109	10Ω 5% 0.33W
3594	4822 117 13577	330Ω 1% 0805 1.25W
3595	3198 021 52240	220kΩ 5% 0805
3596	3198 021 52240	220kΩ 5% 0805
3601	4822 116 52303	8.2kΩ 5% 0.5W
3603	4822 116 52175	100Ω 5% 0.5W
3604	4822 116 52175	100Ω 5% 0.5W
3605	4822 051 30472	4.7kΩ 5% 0.062W
3606	4822 116 52256	2.2kΩ 5% 0.5W
3607	4822 116 52256	2.2kΩ 5% 0.5W
3608	4822 116 83883	470Ω 5% 0.5W
3609	4822 050 11002	1kΩ 1% 0.4W
3610	4822 116 52303	8.2kΩ 5% 0.5W
3611	4822 051 30101	100Ω 5% 0.062W
3614	4822 116 52283	4.7kΩ 5% 0.5W
3615	4822 050 21003	10kΩ 1% 0.6W
3618	4822 050 21003	10kΩ 1% 0.6W
3618	4822 116 83961	6.8kΩ 5%
3622	4822 051 30008	Jumper 0603
3622	4822 051 30471	470Ω 5% 0.062W
3623	4822 051 30472	4.7kΩ 5% 0.062W
3624	4822 116 52175	100Ω 5% 0.5W
3625	4822 116 52175	100Ω 5% 0.5W
3626	4822 051 30472	4.7kΩ 5% 0.062W
3627	4822 051 30472	4.7kΩ 5% 0.062W
3628	4822 051 30103	10kΩ 5% 0.062W
3630	4822 051 30222	2.2kΩ 5% 0.062W
3630	4822 051 30471	470Ω 5% 0.062W
3632	4822 051 30008	Jumper 0603
3634	4822 116 52175	100Ω 5% 0.5W
3635	4822 116 52175	100Ω 5% 0.5W
3636	4822 051 10102	1kΩ 2% 0.25W
3637	4822 051 30759	75Ω 5% 0.062W
3638	4822 051 30759	75Ω 5% 0.062W
3639	4822 051 30008	Jumper 0603
3640	4822 116 52303	8.2kΩ 5% 0.5W
3681	4822 051 20391	390Ω 5% 0.1W
3681	4822 117 11448	180Ω 1% 0.1W
3682	4822 051 20332	3.3kΩ 5% 0.1W
3682	4822 117 11504	270Ω 1% 0.1W
3683	4822 051 20391	390Ω 5% 0.1W
3683	4822 117 11596	390Ω 1% 0,1W
3684	4822 051 20561	560Ω 5% 0.1W
3684	4822 117 11596	390Ω 1% 0,1W
3685	4822 051 20561	560Ω 5% 0.1W
3685	4822 117 11139	1.5kΩ 1% 0.1W
3686	4822 051 20008	Jumper 0805
3686	4822 117 11139	1.5kΩ 1% 0.1W
3687	4822 117 11927	75Ω 1% 0.1W
3688	4822 117 12521	68Ω 1% 0.1W
3689	4822 117 12955	2.7kΩ 1% 0.1W 0805
3691	4822 051 30331	330Ω 5% 0.062W
3693	4822 051 30221	220Ω 5% 0.062W
3694	4822 051 30472	4.7kΩ 5% 0.062W
3801	4822 051 30221	220Ω 5% 0.062W
3802	4822 051 30102	1kΩ 5% 0.062W
3810	4822 051 30759	75Ω 5% 0.062W
3814	4822 117 13632	100kΩ 1% 0603 0.62W
3815	4822 117 13632	100kΩ 1% 0603 0.62W
3816	4822 117 13632	100kΩ 1% 0603 0.62W
3817	4822 117 13632	100kΩ 1% 0603 0.62W
3818	4822 117 13632	100kΩ 1% 0603 0.62W
3819	4822 117 13632	100kΩ 1% 0603 0.62W
3820	4822 117 13632	100kΩ 1% 0603 0.62W
3821	4822 117 13632	100kΩ 1% 0603 0.62W
3822	4822 051 30759	75Ω 5% 0.062W
3831	4822 117 12925	47kΩ 1% 0.063W 0603
3832	4822 116 52175	100Ω 5% 0.5W
3833	4822 116 52175	100Ω 5% 0.5W
3837	4822 116 52175	100Ω 5% 0.5W
3839	4822 116 52175	100Ω 5% 0.5W
3843	4822 051 30222	2.2kΩ 5% 0.062W
3861	4822 117 13632	100kΩ 1% 0603 0.62W
3862	4822 051 30153	15kΩ 5% 0.062W
3863	4822 117 11817	1.2kΩ 1% 1/16W
3864	4822 051 30101	100Ω 5% 0.062W
3865	4822 116 52175	100Ω 5% 0.5W
3866	4822 116 52175	100Ω 5% 0.5W
3867	4822 051 30332	3.3kΩ 5% 0.062W
3891	4822 051 30101	100Ω 5% 0.062W
3893	4822 051 30331	330Ω 5% 0.062W
3894	4822 051 30101	100Ω 5% 0.062W
3896	4822 051 30331	330Ω 5% 0.062W
3901	4822 051 30102	1kΩ 5% 0.062W
3901	4822 051 30682	6.8kΩ 5% 0.062W
3902	4822 051 30332	3.3kΩ 5% 0.062W
3903	4822 051 30153	15kΩ 5% 0.062W
3903	4822 051 30332	3.3kΩ 5% 0.062W
3903	4822 117 12925	47kΩ 1% 0.063W 0603
3904	4822 051 30103	10kΩ 5% 0.062W
3905	4822 051 30332	3.3kΩ 5% 0.062W
3905	4822 117 12925	47kΩ 1% 0.063W 0603
3906	4822 051 30103	10kΩ 5% 0.062W
3907	4822 051 30682	6.8kΩ 5% 0.062W
3907	4822 117 12902	8.2kΩ 1% 0.063W 0603
3909	4822 051 30273	27kΩ 5% 0.062W
3910	4822 051 30273	27kΩ 5% 0.062W
3912	4822 116 52231	820Ω 5% 0.5W
4xxx	4822 051 30008	Jumper 0603
4xxx	4822 051 20008	Jumper 0805
6400	4822 050 21002	1kΩ 1% 0.6W
9611	4822 157 52392	27µH
9672	4822 157 50961	22µH
9678	4822 157 50961	22µH

5001	4822 156 20966	47µH
5001	4822 157 51216	5.6µH 10%
5002	3198 018 18270	820nH 10%
5003	4822 157 11866	1.8µH 10%
5201	4822 157 11139	6.8µH 5%
5201	4822 157 11835	4,7µH 5%
5204	4822 157 11411	Bead 83Ω at 100MHz
5205	4822 157 11411	Bead 83Ω at 100MHz
5206	4822 157 11411	Bead 83Ω at 100MHz
5242	4822 157 11706	10µH 5%
5341	4822 157 50961	22µH
5342	4822 156 21125	3.9µH 10%
5342	4822 157 50961	22µH
5342	4822 157 70698	27µH
5376	4822 526 10704	Bead 45Ω at 50MHz
5401	4822 157 11885	1000µH 5%
5445	2422 531 02471	LOT JF0501-2135 21' / 25'
5445	2422 531 02472	LOT JF0501-2136 29'
5445	2422 531 02581	LOT JF0501-2601 34'
5451	4822 157 11737	22µH 10%
5452	4822 157 11411	Bead 83Ω at 100MHz
5457	2422 536 00425	Linearity coil 21'
5457	2422 536 00507	Linearity coil PSL12-104A B
5457	2422 536 00513	Linearity coil 21' / 25'
5457	3128 138 53181	Linearity coil 29'
5457	4822 157 11712	Linearity coil
5461	2422 531 02446	Transf. SC10009-03 B
5461	2422 531 02465	Transf. SC10015
5461	2422 531 02478	Transf. SC10027-00 B
5461	2422 531 02568	Transf. SD10207-00 B
5463	4822 157 11711	Choke coil
5471	2422 535 94638	6.8µH 20%
5472	4822 157 51157	3.3µH
5472	4822 158 10604	6,8µH
5480	4822 156 20966	47µH
5480	4822 157 63788	18µH 10%
5480	4822 157 70698	27µH
5480	5322 157 51687	39µH
5500	4822 157 10476	20mH 1.5A DMF-2820H
5500	4822 157 11538	10mH 2A DMF-2810H60
5501	4822 157 11523	DMF-2405
5520	2422 531 02462	Transf. SS42025-03 B
5520	2422 531 02544	Transf. PSS42-11
5520	2422 531 02579	Transf. SS49109-00 B
5521	4822 526 10704	Bead 45Ω at 50MHz
5560	4822 526 10704	Bead 45Ω at 50MHz
5561	4822 157 71401	27µH
5562	4822 157 11411	Bead 83Ω at 100MHz
5562	4822 526 10704	Bead 45Ω at 50MHz
5564	4822 526 10704	Bead 45Ω at 50MHz
5602	4822 157 11867	5.6µH 5%
5603	4822 157 11867	5.6µH 5%
5604	4822 157 11867	5.6µH 5%
5831	4822 157 11139	6.8µH 5%
5832	4822 157 11139	6.8µH 5%
5833	4822 157 11139	6.8µH 5%
5835	3198 018 31290	12µH 10%
5861	4822 157 11706	10µH 5%

6001	4822 130 34142	BZX79-B33
6004	4822 130 11525	1SS356
6150	4822 130 11397	BAS316
6201	4822 130 11397	BAS316
6202	4822 130 11397	BAS316
6206	4822 130 11416	PDZ6.8B
6331	4822 130 30842	BAV21
6332	4822 130 11397	BAS316
6333	4822 130 30842	BAV21
6335	4822 130 30842	BAV21
6365	4822 130 31983	BAT85
6366	4822 130 31983	BAT85
6367	5322 130 34337	BAV99
6401	4822 130 34383	BZX79-B47
6445	4822 130 11551	UDZS10B
6447	4822 130 30621	1N4148
6448	4822 130 34167	BZX79-B6V2
6449	5322 130 34337	BAV99
6453	3198 020 55680	BZX384-C5V6
6453	4822 130 11416	PDZ6.8B
6460	9340 559 50112	BY228/24
6461	4822 130 80572	RGP30J
6462	4822 130 34197	BZX79-B12
6463	4822 130 11551	UDZS10B
6464	4822 130 11397	BAS316
6465	4822 130 30842	BAV21
6466	4822 130 30842	BAV21
6467	4822 130 11397	BAS316
6468	4822 130 11397	BAS316
6469	4822 130 41487	BYV95C
6469	5322 130 34979	BYV96E
6470	5322 130 34337	BAV99
6476	4822 130 31024	BZX79-B18
6476	4822 130 34281	BZX79-B15
6481	4822 130 34173	BZX79-B5V6
6482	4822 130 30862	BZX79-B9V1
6483	4822 130 34142	BZX79-B33
6485	4822 130 41487	BYV95C
6486	9322 164 42682	EGP20DL-5100
6487	4822 130 41601	BYV95A
6488	9322 164 42682	EGP20DL-5100
6490	4822 130 41487	BYV95C
6500	3198 010 10640	Bridge cell GBU4K
6500	4822 130 10741	GBU6J
6520	4822 130 41601	BYV95A
6522	4822 130 11152	UDZ18B
6523	4822 130 30621	1N4148
6524	4822 130 31083	BYW55
6525	4822 130 31083	BYW55
6526	9340 548 67115	PDZ22B
6540	4822 130 34167	BZX79-B6V2
6541	4822 130 11551	UDZS10B
6541	9322 150 08685	BZX384-C9V1
6560	3139 120 52021	BYV29X-500
6561	4822 130 32715	SB340
6562	9322 164 42682	EGP20DL-5100
6563	4822 130 11397	BAS316
6565	5322 130 34331	BAV70
6566	4822 130 30621	1N4148
6567	4822 130 11148	UDZ4.7B
6569	4822 130 11397	BAS316
6570	4822 130 10837	UDZS8.2B
6570	9322 163 91685	BZX384-C6V2

6580	4822 130 11397	BAS316
6582	9322 175 70667	STPS10L60D
6681	4822 130 31983	BAT85
6691	9322 050 99682	LTL-10224WHCR
6692	9322 127 54667	TSOP1836UH1
6831	4822 130 30621	1N4148
6901	4822 051 20008	Jumper 0805
6904	4822 051 20008	Jumper 0805

7000	9352 628 51112	TDA8941P/N1
7001	4822 130 63732	MMUN2212
7101	5322 130 60159	BC846B
7102	4822 130 60373	BC856B
7103	5322 130 60159	BC846B
7200	9352 706 10557	TDA9570H/N1/AI
7200	9352 711 31557	TDA9580H/N1/3I
7200	9352 711 32557	TDA9582H/N1/3I
7200	9352 712 27557	TDA9583H/N1/3I
7200	9352 712 42557	TDA9555H/N1/3I
7200	9352 715 39557	TDA9586H/N1/3I
7201	5322 130 60159	BC846B
7202	4822 130 60373	BC856B
7203	4822 130 60373	BC856B
7204	4822 130 60373	BC856B
7205	4822 130 60373	BC856B
7206	5322 130 42755	BC847C
7330	9352 713 37112	TDA6107JF/N3
7360	5322 130 60159	BC846B
7366	9322 167 18676	2SA965
7369	4822 130 60373	BC856B
7373	4822 130 41246	BC327-25
7380	4822 130 43226	2SC2235-O
7382	4822 130 40981	BC337-25
7400	9322 157 37687	STP3NC60FP
7441	4822 130 60373	BC856B
7443	4822 130 44568	BC557B
7450	3198 010 44010	PDTA114ET
7460	9340 550 92127	BU4508DX
7461	4822 130 40981	BC337-25
7462	9340 547 00215	PDTC143ZT
7463	4822 130 41246	BC327-25
7471	0451 900 00151	TDA8357J
7471	9352 701 64112	TDA8359J/N2
7480	4822 130 40823	BD139
7482	4822 130 40823	BD139
7515	8238 274 02070	TCET1103G
7515	9322 175 72667	TCET1104(G)
7520	9352 673 56112	TEA1507P/N1
7521	9322 160 63687	STP7NC80ZFP
7521	9322 163 76687	STU9NC80ZI
7522	5322 130 60159	BC846B
7540	4822 130 40959	BC547B
7541	4822 130 11155	PDTC114ET
7542	4822 130 60373	BC856B
7560	4822 209 16978	LF33CV
7561	9340 547 00215	PDTC143ZT
7580	4822 130 60373	BC856B
7602	9322 147 25682	M24C16-WBN6
7606	9340 547 00215	PDTC143ZT
7802	5322 209 14481	HEF4053BT
7831	9322 187 89682	MSP3425G-PO-B8-V3
7831	9322 191 13682	MSP3415G-PO-C12
7861	9352 671 19557	TDA9853H/V1
7891	5322 130 60159	BC846B
7892	5322 130 60159	BC846B
7901	9322 166 29682	AN7580
7901	9322 181 41682	AN7522N
7903	5322 130 60159	BC846B

Side AV Panel [C]

Various

0163	3139 131 01551	Cable 6p/560/3p-3p
0186	3139 110 38861	Cable 5p/680/5p
0232	4822 267 31014	Socket headphone
0250	4822 265 11606	Connector 3p
0251	4822 267 10735	Connector 3p m
0253	2422 025 16382	Connector 3p m
0254	4822 267 10734	Connector 5p m
0255	4822 267 10565	Connector 4p

⊣⊢

2171	5322 122 32311	470pF 10% 100V
2172	5322 122 32311	470pF 10% 100V
2173	5322 122 32311	470pF 10% 100V
2174	5322 122 32311	470pF 10% 100V
2176	5322 122 32311	470pF 10% 100V
2177	4822 124 40248	10µF 20% 63V
2178	5322 122 32311	470pF 10% 100V
2179	4822 124 40248	10µF 20% 63V

⊣W⊢

3150	4822 116 83884	47kΩ 5% 0.5W
3151	4822 116 83868	150Ω 5% 0.5W
3152	4822 116 83884	47kΩ 5% 0.5W
3153	4822 116 83868	150Ω 5% 0.5W
3156	4822 116 52206	120Ω 5% 0.5W
3157	4822 116 52206	120Ω 5% 0.5W

⊣▷|

6161	4822 130 34278	BZX79-B6V8

Top Control Panel [E]

Various

0215	4822 267 10748	Connector 3p m
1091	4822 276 13775	Switch
1092	4822 276 13775	Switch
1093	4822 276 13775	Switch
1094	4822 276 13775	Switch

⊣W⊢

3088	4822 051 20008	Jumper 0805
3089	4822 051 20008	Jumper 0805
3091	4822 051 20561	560Ω 5% 0.1W
3092	4822 051 20391	390Ω 5% 0.1W
3093	4822 051 20561	560Ω 5% 0.1W
3094	4822 051 20391	390Ω 5% 0.1W
3095	4822 051 20332	3.3kΩ 5% 0.1W
3096	4822 117 11139	1.5kΩ 1% 0.1W
4092	4822 051 20008	Jumper 0805

⊣▷|

6092	4822 130 11528	1PS76SB10

DAF Panel [G]

Various

0180	3139 131 00761	Cable 2p 560mm
0221	4822 267 10966	Connector 2p
0258	4822 267 10966	Connector 2p
0261	4822 267 10676	Connector 1P
0262	4822 267 10676	Connector 1P

⊣⊢

2492	4822 126 13865	390pF 10% 2kV
2493	4822 126 13865	390pF 10% 2kV

⊣W⊢

3498	2322 592 13017	VDR 1mA/423V
3499	2322 592 13017	VDR 1mA/423V

⊣~⊢

5493	4822 148 81425	DAF

Front Interface Panel [Q]

Various

0211	2422 025 16268	Connector 2p m
0212	2422 025 16268	Connector 2p m
0214	2422 025 06353	Connector 5p male
0231	2422 128 02972	Mains switch

⊣⊢

2691	4822 124 12379	220µF 25V
2692	4822 126 13751	47nF 10% 63V
2693	4822 126 13751	47nF 10% 63V
2694	4822 126 13751	47nF 10% 63V
2695	4822 126 13751	47nF 10% 63V
2698	5322 121 42386	100nF 5% 63V

⊣W⊢

3500	4822 053 21335	3.3MΩ 5% 0.5W
3501	4822 053 21335	3.3MΩ 5% 0.5W
3691	4822 116 52219	330Ω 5% 0.5W
3693	4822 116 83872	220Ω 5% 0.5W

⊣▷|

6691	9322 050 99682	LTL-10224WHCR
6692	9322 127 54667	TSOP1836UH1

11. Revision List

First release.